

STATE OF MONTANA



1968 NATIONAL HIGHWAY FUNCTIONAL
CLASSIFICATION STUDY

Montana State Library



3 0864 1006 6590 3



1968 FUNCTIONAL CLASSIFICATION OF MONTANA'S HIGHWAY SYSTEM

AN ENGINEERING STUDY REPORT

To the MONTANA HIGHWAY COMMISSION
in cooperation with the

U. S. DEPARTMENT OF TRANSPORTATION,
FEDERAL HIGHWAY ADMINISTRATION
BUREAU OF PUBLIC ROADS

Prepared by MUNSON-NASH-FUTRELL & ASSOCIATES

October 31, 1969

The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the Montana Highway Commission, or U. S. Department of Transportation, Federal Highway Administration, Bureau of Public Roads.

**MONTANA FUNCTIONAL CLASSIFICATION
ADVISORY COMMITTEE MEMBERS**

Dan Mizner
Montana League of Cities & Towns

Stephen Petrini
Missoula City-County Planning Board

Ralph Shane
Bureau of Indian Affairs

Al Erickson
Montana Automobile Association

Hon. Earl Moritz
State Senator

A. S. Roberts
Yellowstone County Commissioner

Cliff Miller
U. S. Forest Service

Leonard Eckel
Montana Motor Transport Association

Paul R. DeVine
Montana Highway Commission

Don DeGraftenreid
Bureau of Public Roads



MONTANA STATE HIGHWAY COMMISSION

J. M. Nass, Chairman
Poplar, Montana

J. J. Leary, Vice-chairman
Kalispell, Montana

W. M. Kessner
Black Eagle, Montana

G. R. Cooney
Butte, Montana

H. P. Hanson
Billings, Montana

J. D. Wheeler, Secretary
Helena, Montana



MONTANA STATE HIGHWAY DEPARTMENT

L. M. Chittim, P.E.
State Highway Engineer

H. T. Buswell
Assistant State Highway Engineer

Planning Survey Section

P. R. DeVine

J. W. Hahn

K. D. Bingham

R. A. Downs

**DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
BUREAU OF PUBLIC ROADS**

Bureau of Public Roads

G. E. Meyer
Division Engineer

D. R. DeGraftenreid
Planning & Research Engineer

**MUNSON-NASH-FUTRELL
& ASSOCIATES**

Engineering Staff

S. D. Eason P.E., Chief Engineer
K. F. Jones P.E., Project Engineer
A. W. Bettis P.E.
C. M. Dupuis P.E.
W. M. Isaacs P.E.
J. W. Booth
J. K. Sutton



R. E. FUTRELL
B. W. MUNSON
W. M. NASH
C. M. DUPUIS
J. K. SUTTON

MUNSON-NASH-FUTRELL AND ASSOCIATES
138 GRANT ROAD
EAST WENATCHEE, WASHINGTON 98801
PHONE 631-1100
FAX 631-1100
TELETYPE 631-1100
TELEFAX 631-1100

October 30, 1969

Montana State Highway Commission
Helena, Montana
Gentlemen:

In accord with an agreement of May 20, 1969, between the State Highway Commission and Munson-Nash-Futrell and Associates, we are pleased to transmit this report "Functional Classification of Montana's Highway Network."

The project was carried out pursuant to the "1968 National Highway Functional Classification Study Manual" published by the Federal Highway Administration, Bureau of Public Roads.

We believe this report will help to provide for continuity in the comprehensive planning process between this study, and others which are so essential for highway transportation development in Montana. Moreover, we are confident the State Highway Commission, elected, and appointive officials will give deliberate consideration to it's usefulness in future decision making.

We deeply appreciate the cooperation and assistance of the departmental staff, that of the Cities, Counties, Advisory Committee, and Bureau of Public Roads.



Very truly yours,
R. E. Futrell
R. E. Futrell P.E.

TABLE OF CONTENTS

	Page
I. INTRODUCTION	2
Purpose	2
Scope	2
Description of the State of Montana	2
Advisory Committee to the Montana Highway Functional Classification Study	2
Coordination with other State Agencies and Local Governments	2
Coordination with Transportation Planning Studies	2
Existing Highway Networks	2
Methodology Used in Functional Classification	3
Nationwide Functional Classification Systems	3
Population of State and Urban Areas	3
 II. PROCEDURES IN THE FUNCTIONAL CLASSIFICATION OF ROADS AND HIGHWAYS IN RURAL AREAS	5
Ranking and Grouping of Travel Generators	5
Equivalent Population of Recreation Areas	6
Desire Lines of Travel on Rural Highways	6
Functional Classification in Rural Areas	6
General Criteria Used in the Rural Area	6

	Page
III. PROCEDURES IN THE FUNCTIONAL CLASSIFICATION OF URBAN AREAS	7
Establishing Urban-in-fact Boundaries	7
Services to Urban Activity Centers and Arterial Street Spacing Between Routes	7
Functional Classification for Urbanized Areas	7
Urban Functional Systems Guideline Ranges of Mileage	7
Functional Classification for Small Urban Areas	7
General Criteria Used in Preliminary Urban Area Classification	7
Criteria Used in Final Urban Area Classification	8
A. Land Use Consideration and Control of Access	8
B. Average Trip Length	8
C. System Continuity	8
D. Traffic Volume	8
E. Volume Trip Length	8
Vehicle Miles of Travel	8
Travel Disaggregation Adjustment Procedure	8
 IV. CONCLUSIONS	10
Montana's Statewide System Map	10
Urban Area Sample Classification Maps	10
County Sample Classification Maps	10
Summary of Montana's Classified System	11
Plot of Cumulative Road Mileage	11
Deviations	12
Data Summary Forms	12
Functional Classes of Rural Roads by County	12
Functional Classes of Urban Streets by Individual Urban Areas and Population Groups	12
Functional Classes of Rural Roads and Urban Streets by County	12

APPENDICES

Appendix A — Statewide Rural Mileage
Appendix B — Population Estimates
Appendix C — Parks and Recreation Areas in Montana
Appendix D — Economic Considerations
Appendix E — Liaison Reports
Appendix F — References & Bibliography



TABLES

	Page
1. Graphic Methodology used in obtaining Functional Classification	3
2. Functional Classification System Identified	3
3. State of Montana Population for 1960 and 1968 showing Urban and Rural breakdown	3
4. Urban Area Population	3
5. Rural Road Functional Classification Characteristics	6
6. Incorporated Cities not served by Arterial Roads	6
7. Generalized Arterial Street Spacing used	7
8. Functional Classification Characteristics of Urbanized areas having populations of 50,000 or more	7
9. Point multipliers used to weight Travel Generators	8
10. Classified Highways serving County Seats	10
11. Sample Urbanized and Urban Area Maps	11
12. Density of the State of Montana and Sample Counties	12
13. Rural Guidelines of Functional Systems	12
14. Urban Guidelines of Functional Systems	12
15. Statewide Area, Population, Mileage and Travel Summary	14
16. Rural Data Summary	15
17. Small Urban Area Data Summary 5,000 to 9,999 Population	16
18. Small Urban Area Data Summary 10,000 to 24,999 Population	17
19. Small Urban Area Data Summary 25,000 to 49,999 Population	18
20. Urbanized Area Data Summary—Billings	19
21. Urbanized Area Data Summary—Great Falls	20
22. Rural Mileage and Travel by County	21-22
23. Urban Mileage and Travel by County	23-24
24. Rural and Urban Mileage and Travel by County	25-26

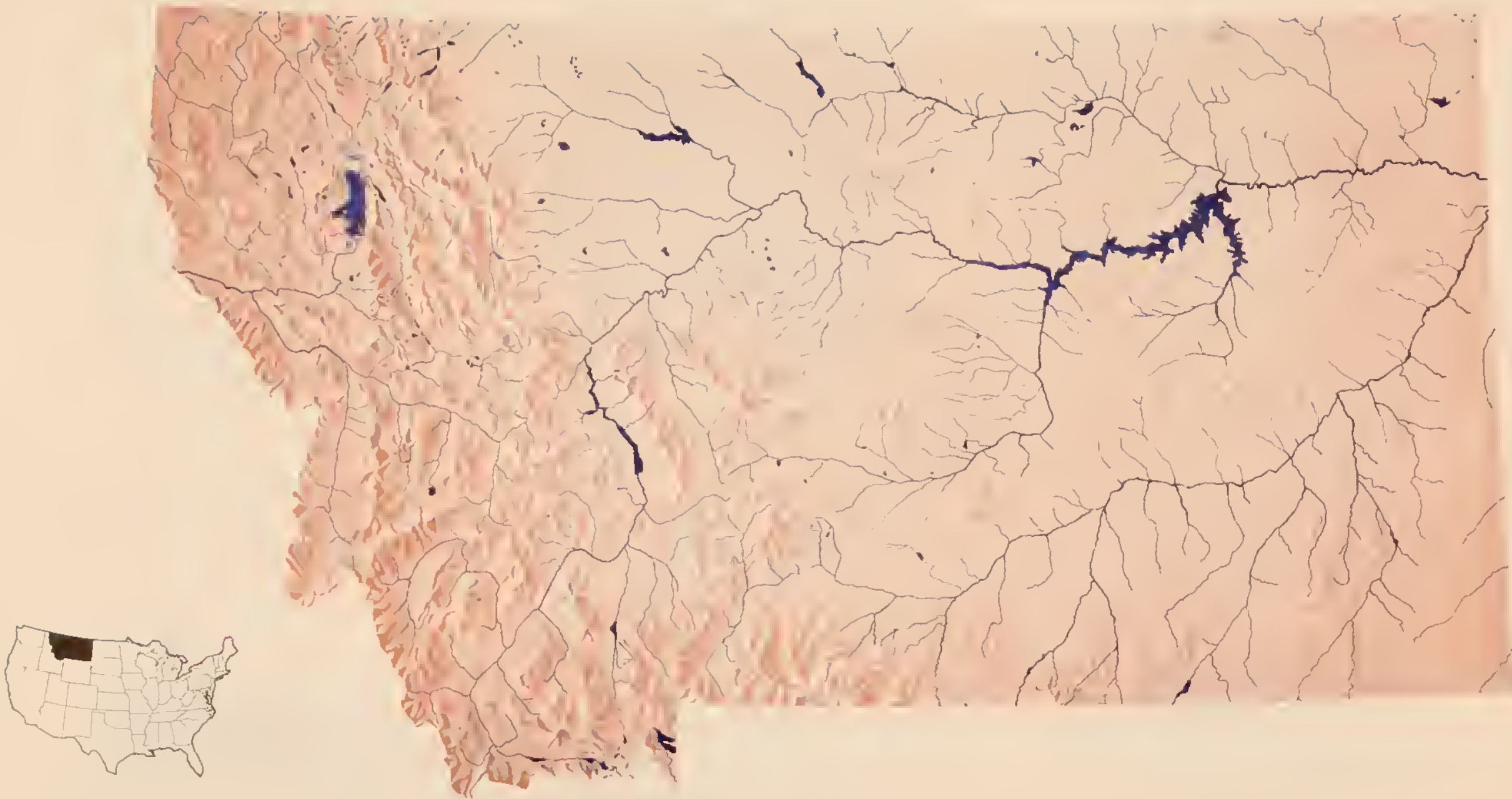
FIGURES

	Page
1. Ranking and Grouping of Travel Generators	5
2. Plot of Cumulative Rural Road Mileage versus Cumulative Vehicle Miles served	13
3. Plot of Cumulative Small Urban Area (5,000-9,999) Street Mileage versus Cumulative Vehicle Miles served	13
4. Plot of Cumulative Small Urban Area (10,000-24,999) Street mileage versus Cumulative Vehicle miles served ..	13
5. Plot of Cumulative Small Urban Area (25,000-49,999) Street mileage versus Cumulative Vehicle miles served ..	13
6. Plot of Cumulative Street mileage versus Cumulative Vehicle miles served for Billings	13
7. Plot of Cumulative Street mileage versus Cumulative Vehicle miles served for Great Falls	13

MAPS

Map Number	Title
1	Relief Map of Montana
2	Existing Statewide Highway Network
3	Statewide Functional Classification Map
4	Billings Urbanized Area Functional Classification
5	Great Falls Urbanized Area Functional Classification
6	Missoula Urban Area Functional Classification
7	Havre Urban Area Functional Classification
8	Lewistown Urban Area Functional Classification
9	Daniels County Functional Classification
10	Teton County Functional Classification
11	Wheatland County Functional Classification
12	Yellowstone County Functional Classification





RELIEF MAP OF MONTANA
1968 HIGHWAY FUNCTIONAL CLASSIFICATION
MONTANA HIGHWAY COMMISSION

MAP NO
1

I. INTRODUCTION

SCOPE

The purpose of this report is to set forth the results of a functional highway classification of all roads and streets in the State of Montana as part of a systematic, nationwide study which will allow comparison of existing Federal-aid systems with present facilities serving current travel demands. Congressional direction for the study is contained in the Federal-Aid Highway Act of 1968.

PURPOSE

All existing public roads and streets in Montana, except primitive roads, are classified as principal arterials, minor arterials, collectors, and local roads or streets, based upon their present most logical use. This classification disregards the existing Federal-aid system and jurisdictional responsibilities. Conditions as of December 31, 1968, are the basis upon which the study was conducted.

Travel characteristics differ substantially, which requires separate classification procedures to be used for different areas. The areas established are: (1) Urbanized areas having a population greater than 50,000; (2) small urban areas with 5,000 to 49,999 population, which are further subdivided into three groupings of 5,000 to 9,999; 10,000 to 24,999; and 25,000 to 49,999 population; and (3) rural areas. Road and street system maps for each urban area, each county, and the State were prepared. These may be obtained from the Planning Survey Section of the Montana State Highway Commission. Sample maps for the two urbanized areas, three small urban areas and four counties are included in this report.

The methods used in classifying the highways, roads, and streets in this report were based upon the **1968 National Highway Functional Classification Study Manual**, prepared by the Bureau of Public Roads. When required by local conditions, deviations were made from the manual and are explained.

DESCRIPTION OF THE STATE OF MONTANA

Montana, the fourth largest state in the Union, is approximately 580 miles long from east to west, and approximately 315 miles wide from north to south. Within its 147,138 square mile area are some of the Nation's most rugged and beautiful mountains, dry land farms, open cattle and sheep range, and game preserves. Montana's extreme temperatures range from -68 F. to 113 F. and its terrain varies between 12,850 feet at Granite Peak to 1,820 feet where the Kootenai River crosses Montana's western boundary.

The western third of the State is mountainous, mineral and timber resources, power production and tourism dominate the economy. The eastern two-thirds of the State is characterized by agriculture, grazing and petroleum production. With a 1968 population of 693,000, the density of Montana was 4.8 persons per square mile as compared with a 1960 density of 60.1¹ persons per square mile for the contiguous 48 states. Map 1 shows the terrain of the State.

Montana's location between the industrial states to the east and west causes its principal cross-state roads to be used extensively for interstate trucking, tourism and travel.

ADVISORY COMMITTEE TO THE MONTANA HIGHWAY FUNCTIONAL CLASSIFICATION STUDY

The advisory committee, made up of a cross-section of citizens interested in Montana's transportation planning, met twice and reviewed the progress of this study. At the last meeting held on September 16, 1969, a presentation was made of the procedures followed in the classification process and the results as it pertained to the arterial system. This presentation received the concurrence of the committee.

¹See Appendix F.

COORDINATION WITH OTHER STATE AGENCIES AND LOCAL GOVERNMENTS

The Montana State Highway Commission has coordinated its road classification program with the highway departments of the neighboring states of North Dakota, South Dakota, Wyoming and Idaho. In addition, consideration was given to the traffic generators in the adjacent Canadian Provinces of British Columbia, Alberta and Saskatchewan. This procedure provided for interstate and international continuity in road classification.

The Montana State Departments of Planning and Economic Development, and Fish and Game, were contacted to coordinate highway functional classification with State-wide planning.

Federal agencies from whom input has been received include the Bureau of Indian Affairs, Bureau of Land Management, U. S. Forest Service, National Park Service, and the Bureau of Public Roads.

Local urban areas over 5,000 population were contacted directly, and meetings were held with county and city officials of the urban areas to coordinate local plans with the statewide road and street classification. Preliminary county classification plans were mailed to all counties in Montana to obtain their input into the study. All but four of the fifty-six counties returned the maps, some with comments.

COORDINATION WITH TRANSPORTATION PLANNING STUDIES

Those cities having completed, or who were in the process of preparing a transportation study, were contacted and consideration was given to integrate planning with the highway functional classification study.

EXISTING HIGHWAY NETWORKS

Map 2 shows the existing Federal Aid System and U. S. Forest Service Highway Routes for the State of Montana and illustrates the existing highway network.

METHODOLOGY USED IN FUNCTIONAL CLASSIFICATION

To obtain a statewide system of functional classification, similar principles and procedures were uniformly applied to all areas of the State. Base maps showing all streets, roads, and highways were obtained. Placed on top of these maps were transparent overlay sheets with the items shown in Table 1.

To determine traffic generators and major and minor lines of travel, it was necessary to study the land use, economy and social significance of an area. The classification of streets and roads was based upon the desire lines of travel, street or road continuity, traffic volumes, control of access, and other considerations.

NATIONWIDE FUNCTIONAL CLASSIFICATION SYSTEMS

The functional classification system of streets and highways used herein is in accordance with the Bureau of Public Roads Manual and is presented in Table 2.

POPULATION OF STATE AND URBAN AREAS

The urban and rural population for Montana in 1960 and 1968 (est.) is shown in Table 3. This table illustrates the rural nature of the State of Montana where nearly half the State's population were rural residents in 1960 and 1968, as compared to a 1960 national average of less than one-third rural.³ Montana's unusually high rural population differentiates it from almost every other state and contributes to deviations in the classification of rural roads from the national averages. These deviations are described in the discussion of ranking and grouping travel generators.

The populations for the individual cities and urban areas in 1960 and 1968 (est.) are shown in Table 4. Only two urbanized areas have population in excess of 50,000, while sixteen urban areas contain between 5,000 and 49,999 people. The remainder of the State is considered to be rural.

Table 1	
GRAPHIC METHODOLOGY USED IN OBTAINING FUNCTIONAL CLASSIFICATION	
Maps Used	Purpose
1. Base Map	Visual Description of Existing System
2. Traffic Generators	Established Travel Needs
3. Major Traffic Desires	Connects Principal Traffic Generators
4. Principal Arterial System	Utilizes Existing Streets and Highways to Correspond to Major Traffic Desires
5. Minor Traffic Desires	Connects Lesser Traffic Generators to Major or Lesser Traffic Generators
6. Minor Arterial System	Utilizes Existing Streets or Highways to Correspond to Minor Traffic Desires
7. Connector Streets and Highways	Provides for Connections to Arterial Streets and Highways from Minor Traffic Generators

Table 2		
FUNCTIONAL CLASSIFICATION SYSTEM IDENTIFIED		
Rural Areas	Urbanized Areas	Small Urban Areas
Principal Arterial Highways	Principal Arterial Highways	Principal Arterial Highways
1. Interstate	1. Interstate	1. Interstate
2. Other Principal Arterials	2. Other Freeways and Expressways	2. Other Freeways and Expressways
	3. Other Principal Arterials	3. Other Principal Arterials
Minor Arterial Roads	Minor Arterial Streets	Minor Arterial Streets
Collector Roads	Collector Streets	Collector Streets
1. Major		
2. Minor		
Local Roads	Local Streets	Local Streets

Table 3				
STATE OF MONTANA POPULATION FOR 1960 AND 1968 SHOWING URBAN AND RURAL BREAKDOWNS				
	1960 Population	% of State Total	1968* Population	% of State Total
State Total	674,767	100	693,000	100
Urban Total	338,457	50.2	355,624	51.2
Urbanized	118,341	17.6	130,720	18.8
Small Urban	220,116	32.6	224,904	32.4
Rural	336,310	49.8	337,376	48.8

*Estimated. See Appendix II

Table 4		
URBAN AREA POPULATION		
	1960 City Population	1968* Urban Population Estimates
Urbanized Area with Population Over 50,000 in 1968		
Great Falls	55,357	67,183
Billings	52,851	63,537
Urban Areas with Population of 25,000 to 49,999 in 1968		
Missoula	27,090	40,282
Butte	27,877	39,990
Urban Areas with Population of 5,000 to 24,999 in 1968		
Helena	20,227	24,606
Kalispell	10,151	17,538
Bozeman	13,361	15,929
Havre	10,740	12,469
Miles City	9,665	11,065
Anaconda	12,054	9,474
Glasgow	6,398	8,371
Livingston	8,229	7,982
Lewistown	7,408	7,912
Glendive	7,058	7,902
Libby	2,828	5,814
Laurel	4,601	5,234
Deer Lodge	4,681	5,178
Cut Bank	4,539	5,158

*The 1968 urban population estimate is based upon population within an actual urban confine and does not take into consideration political boundaries. See Appendix B for method of computation.

II. PROCEDURES IN THE FUNCTIONAL CLASSIFICATION OF ROADS AND HIGHWAYS IN RURAL AREAS

RANKING AND GROUPING OF TRAVEL GENERATORS

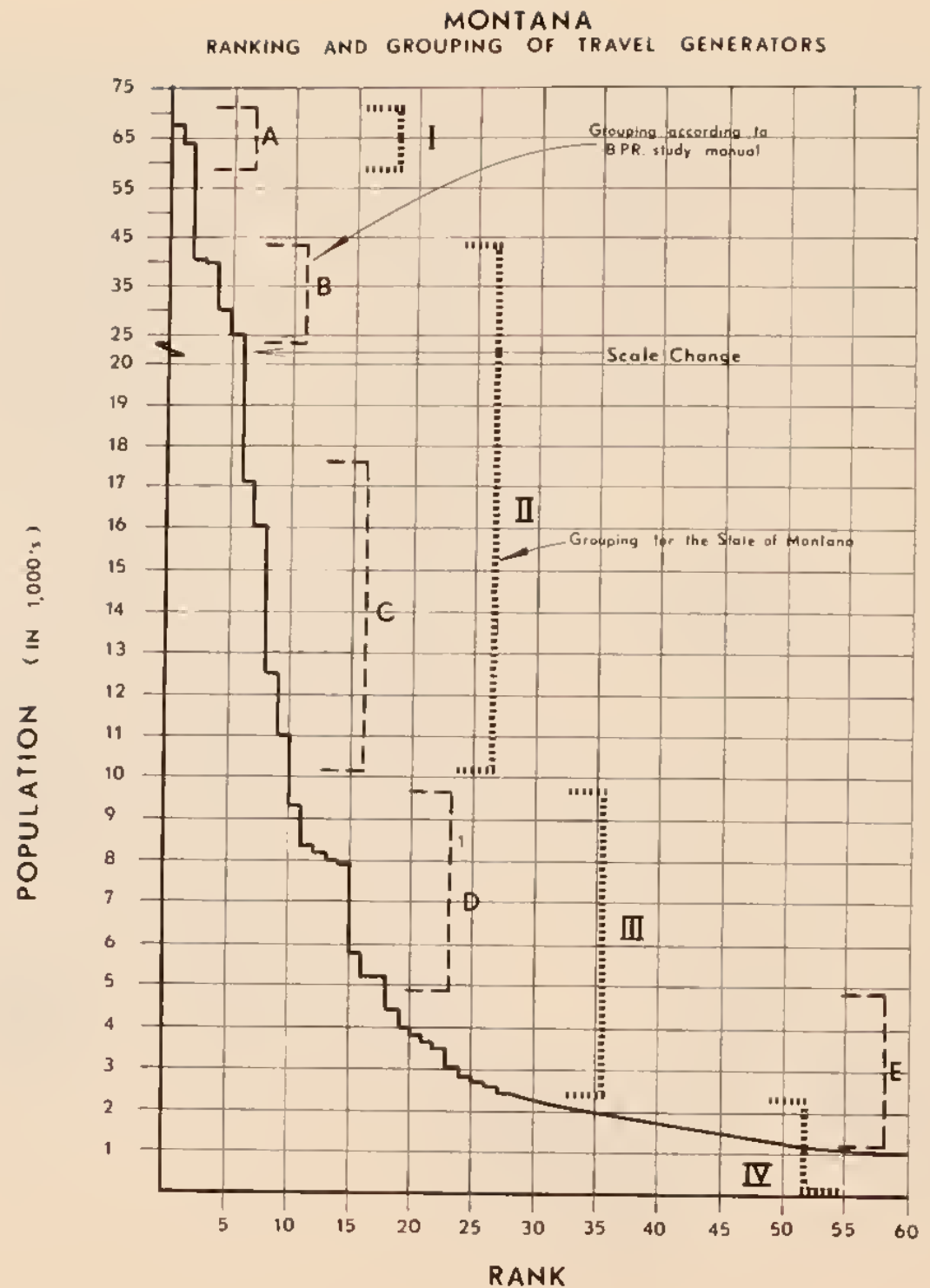
Population and recreation centers are major generators of traffic. To determine the relative travel desires between travel generators, they were ranked according to their estimated 1968 population, as shown in Figure 1.

Montana's small overall population, large land area, and long distances between population centers suggested the grouping of Montana's urban areas into four categories. This differs from the groupings recommended by the 1968 National Highway Functional Classification Study Manual, as shown by letter on Figure 1.

The urban areas, ranked by population, were then placed into four basic groups. All major population centers of 50,000 or more were designated Group I. Group II included small urban areas of 10,000 population to 49,999. Group III included the small urban areas and other population centers between 2,500 and 9,999 population, while Group IV included all other communities having a population less than 2,500. The travel desires served by routes connecting urban areas in Groups I and II are of the greatest magnitude; therefore designating routes with high functional classifications.

Communities in Montana that have a population of 10,000 or more serve a significantly large rural area, and have a state-wide importance which is much greater than their population indicates.

An investigation of the economic impact in the cities and towns through sales receipts and banking deposits showed some small changes in the relative importance of the cities, as shown in Appendix D. However, in no instance did the urban areas move out of their respective groupings as shown by Figure 1.



Major traffic generators outside Montana, affecting travel within the State, were considered in the functional classification of rural roads. These centers are: Spokane, Washington; Idaho Falls, Idaho; Yellowstone National Park, (Montana and Wyoming); Sheridan, Wyoming; and Bismarck, North Dakota.

Cities in Canadian Provinces of Kimberly, B. C.; Lethbridge and Medicine Hat, Alberta; and Regina, Saskatchewan, were also considered in the functional classification of roads.

EQUIVALENT POPULATION OF RECREATION AREAS

Recreation areas are major travel generators, and driving for pleasure has become America's most important recreational activity.⁵ The use of recreation areas is a function of population, available leisure time, income and mobility. The most widely used recreation facilities in Montana in 1968 were Yellowstone National Park with 2,186,000 visitors, and Glacier National Park with 964,000 visitors.⁶ These areas have an urban area population equivalent of 30,000 for Yellowstone National Park and 8,500 for Glacier National Park. Additional recreation areas, shown in Appendix D, do not now have user information to gauge their population equivalency. It was assumed that only the two national parks have sufficient concentration of visitors to affect this study, since the National Forests are spread throughout the western third of the State, and the State Parks do not now have the facilities to handle large volumes of daily visitors.

DESIRE OF TRAVEL ON RURAL HIGHWAYS

Desire lines represent the most direct routes between major travel generators. In the case of rural areas, it was the linking of cities and recreation areas. Two types of desire lines were plotted. (1) major desire lines linking the major traffic generators of Groups I and II; and (2) minor desire lines linking the lesser traffic generators of Group III.

FUNCTIONAL CLASSIFICATION IN RURAL AREAS

Roads outside urban-in-fact boundaries in this study are defined as rural roads. The characteristics, as set forth in the 1968 National Highway Functional Classification Study Manual, of the different classifications, are discussed in Table 5.

The 1968 National Highway Functional Classification Study Manual suggests that the rural classification systems mileage fall within the following percentage ranges: (1) Principal Arterial plus Minor Arterial System—6-12%; (2) Collector—20-25%; and (3) Local Road System—65-75%. Montana's rural system falls within these ranges.

GENERAL CRITERIA USED IN THE RURAL AREAS

The Interstate Highway System is by definition classified as part of the principal arterial system, and is further subclassified either as completed Interstate Highway or as Interstate traveled way. The other rural principal arterials are those existing roads that most closely satisfy the principal desire lines. The principal arterial system consists of 4.4 per cent of the total rural miles of roads and carries 35.5 per cent of the rural vehicles miles of travel in the State.

The rural minor arterials satisfy the secondary desire lines on roads that serve Group III travel generators. The minor arterial roads contain 6.0 per cent of the rural road miles and 22.5 per cent of the vehicle miles of travel.

In selecting the routes to serve the desire lines of travel for population centers of 10,000 or more all other urban areas of 5,000 and over were also served by the system. In addition, serving the desire lines of population areas of 2,500 or more as shown in Group III on figure 1, all remaining incorporated communities except five are served by the Principal and Minor arterial systems. These five are shown in Table 6.

The rural major collector roads link the balance of traffic generators and make up 7.4 per cent of road miles and 10.1 per cent of the rural vehicle miles of travel.

The rural minor collector roads are selected to provide a reasonable spacing between arterial roads and to serve clusters of residences, land services, and other important establishments which may be at considerable distance from other arterial roads. These minor collectors make up 15.4 per cent of the rural roads and 7.7 per cent of vehicle miles of travel.

The remaining rural roads are designated as local rural roads whose main function is that of land service.

Table 5

RURAL ROAD FUNCTIONAL CLASSIFICATION CHARACTERISTICS

Principal Arterial (to be stratified into completed Interstate System and other principal arterials)

1. Serves substantial Statewide or Interstate Travel.
2. Serves all, or virtually all, Urban Areas of 50,000 and more population and a large majority of urban areas with 25,000 population and over.
3. Provides an integrated network without stub connections except for international boundaries.

Minor Arterial

1. Links cities, larger towns and major resort areas providing interstate and inter-county service.
2. Spaced to bring developed areas within a reasonable distance of an arterial highway.
3. Provides for relatively high overall travel speeds with minimum interference to through movement.

Major Collector

1. Service to County seats, traffic generators of intra-county importance and larger towns not on arterial routes.
2. Links traffic generators.
3. Serves intra-county corridors.

Minor Collector

1. Be spaced at intervals to collect traffic from local roads.
2. Provide service to remainder of local communities.
3. Link locally important traffic generators with rural hinterland.

Table 6

INCORPORATED CITIES NOT SERVED BY ARTERIAL ROADS

Incor- porated City	Popu- lation	Distance from Minor Arterial in Miles
Kevin	375	4.5
Outlook	220	6
Winifred	220	21
Bear Creek	61	5
Ismay	59	5

III. PROCEDURES IN THE FUNCTIONAL CLASSIFICATION OF URBAN AREAS

ESTABLISHING URBAN-IN-FACT BOUNDARIES

The urban-in-fact boundary was established on the basis of actual land use as of December 31, 1968, as determined from recent aerial photography and field checked for accuracy. The basic criteria for determining the urban area was a minimum population of 5,000. The boundary determination was based on a density of 1,000 people per square mile. Urban activity related to and contiguous to urban areas such as airports, industries, and recreation facilities were considered urban; although their density may not reach the 1,000 people per square mile criteria.

SERVICES TO URBAN ACTIVITY CENTERS AND ARTERIAL STREET SPACING BETWEEN ROUTES

A principal arterial is considered to serve an activity center when it is within one-half to one mile from the user, while for a minor arterial street, the range should be from one-quarter to one-half mile. Table 7 below shows the general guidelines used in arterial street spacing.

The principal urban activity centers were identified on a base map and interconnected with principal desire lines which indicated the need for principal arterials.

FUNCTIONAL CLASSIFICATION FOR URBANIZED AREAS

The functional classification system of streets used herein is in accordance with the 1968 National Highway Functional Classification Study Manual and is presented in Table 8 for urbanized areas.

URBAN FUNCTIONAL SYSTEMS GUIDELINE RANGES OF MILEAGE

The 1968 National Highway Functional Classification Study Manual suggests that the urbanized classification system mileage fall within the following percentage ranges: (1) principal arterial plus minor arterial street systems—15-25%; (2) collector street systems—5-10%; and (3) local street systems—65-80%.

FUNCTIONAL CLASSIFICATION FOR SMALL URBAN AREAS

The procedures for classifying streets in small urban areas are generally identical to the method for classifying streets in urbanized areas. The main difference is that, because of their size, small urban areas will not generate internal travel warranting urban arterial service. No guidelines are set forth establishing percentages for small urban areas, except that principal arterial streets generally make up a lower percentage of the total system. In the urban areas that are long and narrow, the principal arterial streets make up a higher percentage of the total system.

GENERAL CRITERIA USED IN PRELIMINARY URBAN AREA CLASSIFICATION

Base maps and aerial photographs were obtained for each urban and urbanized area showing the existing development and street patterns, following which, a preliminary classification of the total arterial system was prepared. This system was based upon continuity, land use considerations, route spacing, trip length, traffic volume, and intersection control. Existing use of arterial streets was a major consideration.

After the preliminary street classification was completed, it was field checked in each of the eighteen urban and urbanized areas for compatibility with actual street usage. Changes, if needed, were made in the field. This classification was then presented to local city and county officials for their review and comments, and wherever possible, their recommendations were considered in the final classification.

Table 7 GENERALIZED ARTERIAL STREET SPACING USED	
Area Type	Spacing
Central Business District	1/8 to 1/2 mile
Other highly developed urban areas	1/2 to 1 mile
Suburban areas	1 to 2 miles
Low density suburban	2 to 3 miles

Table 8 FUNCTIONAL CLASSIFICATION CHARACTERISTICS OF URBANIZED AREAS HAVING POPULATIONS OF 50,000 OR MORE	
Principal Arterial (Interstate completed, other freeways and expressways, other principal arterials)	
1. Service major centers of activity.	
2. Contain highest traffic volume corridors.	
3. Serve longest trip desires.	
4. Provide continuity with rural arterials.	
Minor Arterial	
1. To interconnect and augment urban principal arterial system.	
2. To provide trips of moderate length with somewhat lower level of travel mobility and higher land service than principal arterials.	
3. Facilities that provide intra-community continuity.	
4. Urban connections to rural collectors.	
5. Spaced upon activity, density and terrain.	
Collector	
1. May penetrate neighborhoods to distribute traffic from arterials to local streets.	
2. Generally not a through street.	
3. Provides land access.	

CRITERIA USED IN FINAL URBAN AREA CLASSIFICATION

Following review of the preliminary classification by the local officials, each urban area was classified in accordance with the procedures outlined in the 1968 National Highway Functional Classification Study Manual. This classification was compared with the preliminary classification and, wherever possible, the desires generated at the local level were recognized. Interstate highways, other freeways and expressways were readily identifiable. It was then necessary to determine other principal arterials, as compared to the other arterial street classifications. The following paragraphs, A-E, describe the criteria deemed most useful for the functional classification of urban roads and streets:

A. Land Use Consideration and Control of Access

Urban arterial streets are used as dividers of differing land uses. Moreover, arterial streets are used to separate residential neighborhoods. Land use accessibility to an arterial street has an inverse relationship to its functional classification.

B. Average Trip Length

The principal arterial streets, as a general rule, serve longer trip lengths than lesser arterial streets. Likewise, the minor arterial streets serve longer trip lengths than the collector.

C. System Continuity

The classified system within an urban or urbanized area should provide continuity with its rural counterparts. Within the urban or urbanized area principal arterials were examined for continuity internally and at the urban-in-fact boundary; the minor arterial streets and collector streets, which are intermingled with the principal arterials, were also examined for continuity of the total system.

D. Traffic Volume

Almost all high traffic volume streets are a part of the total classified network, therefore, traffic volume is a major consideration. In some instances, traffic volume in the outlying areas may be lower on a principal arterial street than on a minor street in the downtown area of a city. For this reason, traffic volume must be used in conjunction with other criteria.

E. Volume Trip Length

A combination of traffic volume and trip length was used to help determine the classification of arterial streets. Volume trip length indexes, which are link volumes multiplied by average daily traffic on the link, were not used because the two urbanized areas in Montana where they may have been applied were too small. Instead of this, a point system multiplier was established as shown in Table 9. These points were used in conjunction with trip assignments to weight the area importance of traffic generators.

Desire lines were then drawn based upon the ranking of the weighted generators.

Table 9 POINT MULTIPLIERS USED TO WEIGHT TRAVEL GENERATORS	
Points	Significance
1	Local or Neighborhood
2	Inter-urban Area
3	Regional

VEHICLE MILES OF TRAVEL

Traffic flow data for the statewide highway network and for Billings, Great Falls, and Missoula were readily available. For streets and roads, where traffic counts were not available, estimates were made, these were based on average daily traffic of the adjacent streets and the population or travel generators that these streets or roads serve. Average daily traffic multiplied by the link mileage was used to compute daily vehicle miles of travel.

As an overall check of vehicle miles of travel, the fuel consumption in the State of Montana was converted into miles of travel. The computations for this conversion are shown in Appendix A.

TRAVEL DISAGGREGATIONAL-ADJUSTMENT PROCEDURE

In order to provide travel estimates for each rural and urban area, assignments of the total statewide vehicle miles of travel were made, first for each county and then for each urban area. These assignments were made on the basis of population, motor vehicle registration, fuel consumption, area and road or street miles.

The travel estimates were compared with the vehicle miles of travel as determined by multiplying the average daily traffic with the link mileage.



IV. CONCLUSIONS

MONTANA'S STATEWIDE SYSTEM MAP

The statewide map showing the rural principal arterial system and the rural minor arterial system is shown on Map 3 (Following Page 26.)

The Interstate highway, Interstate traveled way, principal and minor arterials serve all but five incorporated cities. These five cities are listed in Table 6. Table 10 shows the counties, county seats, and the classification of highways serving the county seats.

URBAN AREA SAMPLE CLASSIFICATION MAPS

Classification maps are presented for both urbanized areas, three small urban areas and four counties. (Maps 4-12.) The small urban areas were chosen so that a sample map from each population group would be presented. The areas, map number, population and population groups are shown on Table 11.

Classification maps of other urban areas are available from the Planning Survey Section, Montana State Highway Commission.

COUNTY SAMPLE CLASSIFICATION MAPS

The classification maps showing the rural systems are shown on the four sample county maps, included herein (Maps 9 through 12).

The counties were chosen on the basis of their rural population densities. One county's rural population density was greater than the state's rural average, one county's rural population density



TABLE 10

Chart Illustrating Classification of Service to County Seats

County	County Seats	Rural Inter-state	Rural Other Prin. Arterials	Rural Minor Arterials	Rural Major Collectors	Rural Minor Collectors
Beaverhead.	Dillon	X		X		X
Big Horn	Hardin	X		X	X	
Blaine	Chinook.		X		X	
Broadwater	Townsend		X	X	X	X
Carbon	Red Lodge			X	X	X
Carter	Ekalaka			X		X
Cascade	Great Falls.	X	X		X	X
Choteau	Fort Benton		X	X	X	
Custer.	Miles City	X		X		X
Daniels	Scobey			X		
Dawson	Glendive	X		X	X	
Deer Lodge	Anaconda			X		X
Fallon	Baker		X	X	X	X
Fergus	Lewistown		X	X	X	X
Flathead	Kalispell		X	X	X	X
Gallatin....	Bozeman	X	X	X		X
Garfield	Jordan			X		X
Glacier.	Cut Bank		X		X	
Golden Valley	Ryegate			X	X	
Granite	Philipsburg			X	X	
Hill....	Havre		X	X	X	
Jefferson.	Boulder	X		X		
Judith Basin.	Stanford			X		X
Lake.	Polson		X	X	X	X
Lewis & Clark	Helena	X	X		X	X
Liberty	Chester		X		X	X
Lincoln.	Libby		X	X		X
McCone	Circle			X	X	X
Madison.	Virginia City.			X	X	X
Meagher	White Sulphur Springs			X	X	X
Mineral	Superior	X			X	X
Missoula	Missoula	X	X	X	X	X
Musselshell	Roundup		X	X		X
Park	Livingston.	X		X		X
Petroleum	Winnett.			X	X	
Phillips	Malta		X	X		X
Pondera	Conrad	X			X	
Powder River	Broadus			X	X	

Table 10 continued on next page

(Table 10 continued)

County	County Seat	Rural Inter- State	Rural Other Prin. Arterials	Rural Minor Arterials	Rural Major Collectors	Rural Minor Collectors
Powell	Deer Lodge	X		X		
Prairie	Terry	X			X	X
Ravalli	Hamilton		X		X	X
Richland	Sidney			X		X
Roosevelt	Wolf Point		X	X	X	
Rosebud	Forsyth	X		X		X
Sanders	Thompson Falls			X	X	X
Sheridan	Plentywood			X		X
Silver Bow	Butte	X		X		X
Stillwater	Columbus	X		X	X	
Sweet Grass	Big Timber	X		X	X	X
Teton	Choteau			X	X	X
Toole	Shelby	X	X			X
Treasure	Hysham				X	X
Valley...	Glasgow		X	X	X	
Wheatland	Harlowton			X		X
Wibaux...	Wibaux	X		X	X	X
Yellowstone	Billings	X	X	X	X	X

was lower than the State's rural average; and two counties had a density approximately the same as the State's rural average. Table 12 shows the counties with their rural population densities.

The average density of counties was computed on the basis of the formula below:

$$\frac{\text{Total Population} - \text{Urban-in-fact population}}{\text{Total Land Area} - \text{Urban-in-fact area}} = \text{Rural Density}$$

The rural average density in the State, using the above formula, was 2.32 people per square mile.

Functional Classification Maps for all other counties are available from the Planning Survey Section, State of Montana Highway Commission.

SUMMARY OF MONTANA'S CLASSIFIED SYSTEM

Detailed street and road functional classifications have been developed for all rural and urban areas in Montana. Tables 22 and 23 are summary of the statewide classifications, showing the miles, travel, and their percentages, for each functionally classified system.

PLOT OF CUMULATIVE ROAD MILEAGE

Figures 2 through 7 indicate the ratio of principal arterials, minor arterials, collectors, and local roads or streets graphically for: (1) the State's rural area; (2) small urban areas from 5,000 to 9,999; (3) small urban areas from 10,000 to 24,999; (4) small urban areas from 25,000 to 49,999; (5) the Billings urban area; (6) the Great Falls urban area. Tables 13 and 14 show the range of variation in percentages that would ordinarily apply to both urban and rural areas for each functionally classified system as recommended in the 1968 National Highway Functional Classification Study Manual.



Table 11
SAMPLE URBANIZED AND URBAN AREA MAPS

Urbanized or Urban Area	Map No.	Population	Population Group
Billings	4	63,537	Over 50,000
Great Falls	5	67,183	Over 50,000
Missoula ..	6	40,282	25,000-49,999
Havre	7	12,469	10,000-24,999
Lewistown	8	7,912	5,000-9,999

DEVIATIONS

For the most part, the final classification follows closely the guidelines set forth in Tables 13 and 14.

In the rural areas the mileage per cent of principal arterials is slightly high. The State as a whole has a low population density and relatively longer distances between population centers as compared with other states. To connect up the population centers, both within and outside the State, requires a small increase in principal arterial mileage over that which is considered normal for an average state, as shown in Table 13. The deviation is considered appropriate for these conditions.

For the totals of urban areas of all sizes, the mileage percentage for each classification is within the limits set forth in Table 14, although there are individual cities and population groups that deviate slightly. The vehicle miles of travel, however, are generally low for minor arterials and high for collectors. Adjustments to bring these percentages within the prescribed limits was given careful consideration, but to do so would have been in violation of other criteria.

For the most part, the arterial systems in the urban areas are continuations of rural routes and the major urban generators lie along these routes. The remaining generators are of such a nature that an arterial is not warranted. In addition, the classification of most of these streets as minor arterials rather than collectors, would mean having arterials penetrate neighborhood areas rather than providing the designated function of such a facility. Another factor that was given special attention was the spacing of the arterials as shown in Table 7. These criteria taken in combination show that the deviations for vehicle miles of travel between minor arterials and collectors are appropriate for the prevailing conditions in Montana.

Table 12 DENSITY OF STATE OF MONTANA AND SAMPLE COUNTIES				
	Map No.	Topo- graph	Dens- ity	County Seat
Rural Density State of Montana			2.32	
Daniels County	9	Flat	2.37	Scobey
Teton County	10	Flat & Mtns.	2.16	Choteau
Wheatland County	11	Flat	1.13	Harlowton
Yellowstone County	12	Flat & Mtns.	5.20	Billings

Table 13 RURAL GUIDELINES OF FUNCTIONAL SYSTEMS	
Systems	Percentage of Total Rural Miles
Principal arterial system	2-4 with most State fall- ing in 7-10 per cent range.
Principal arterial plus minor arterial road system	6-12,
Collector (major plus minor road sys- tem)	20-25
Local road system	65-75

Table 14 URBAN GUIDELINES OF FUNCTIONAL SYSTEMS		
Systems	Range VMT	per cent Miles
Principal arterial system	40-55	5-10
Principal arterial plus minor arterial street systems	65-75	15-25
Collector street system	5-10	5-10
Local street system	15-30	65-80

DATA SUMMARY FORMS

Data Summary Forms are presented for (1) the rural area; (2) small urban areas, population 5,000 to 9,999; (3) small urban areas, population 10,000 to 24,999; (4) small urban areas, population 25,000 to 49,999; (5) the Billings urbanized area; and (6) the Great Falls urbanized area, as required by the 1968 National Highway Functional Classification Study Manual. See Tables 16-21, Data Summary.

Table 15 summarizes statewide area, population, mileage and travel summary.

FUNCTIONAL CLASSES OF RURAL ROADS BY COUNTY

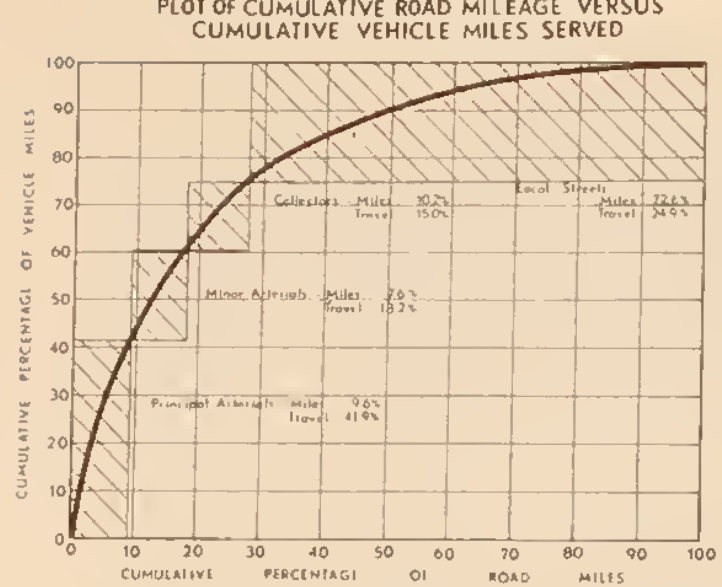
Table 22 summarizes the functional classified system of rural roads by county. This table includes the mileage, mileage percentage of classified system to the total in the county, daily vehicle miles of travel and the percentage of the daily vehicle miles of travel for each classified system to the total in the county.

FUNCTIONAL CLASSES OF URBAN STREETS BY INDIVIDUAL URBAN AREAS AND POPULATION GROUPS

Table 23 summarizes the functional classified system of urban streets for each urban area. This table includes the mileage, mileage percentage of classified system to the total in the urban area, daily vehicle miles of travel and the percentage of the daily vehicle miles of travel for each classified system to the total in each urban area.

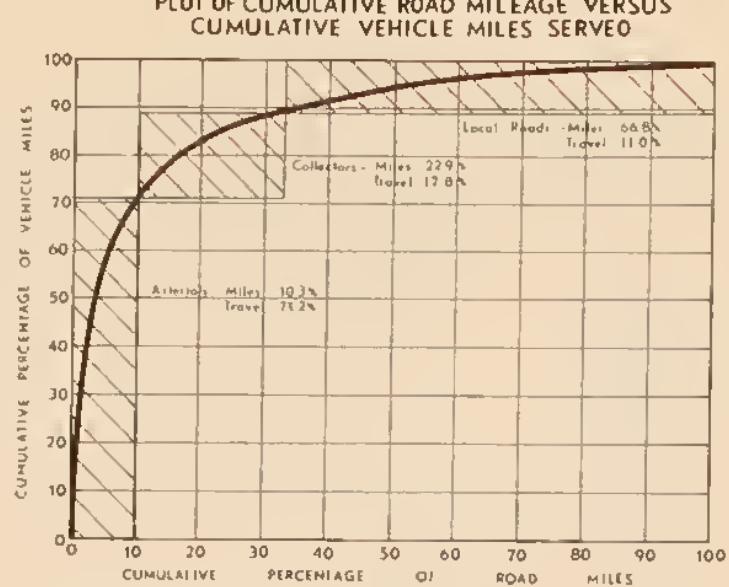
FUNCTIONAL CLASSES OF RURAL ROADS AND URBAN STREETS BY COUNTY

Table 24 is a combination of Tables 22 and 23, excluding the percentages.



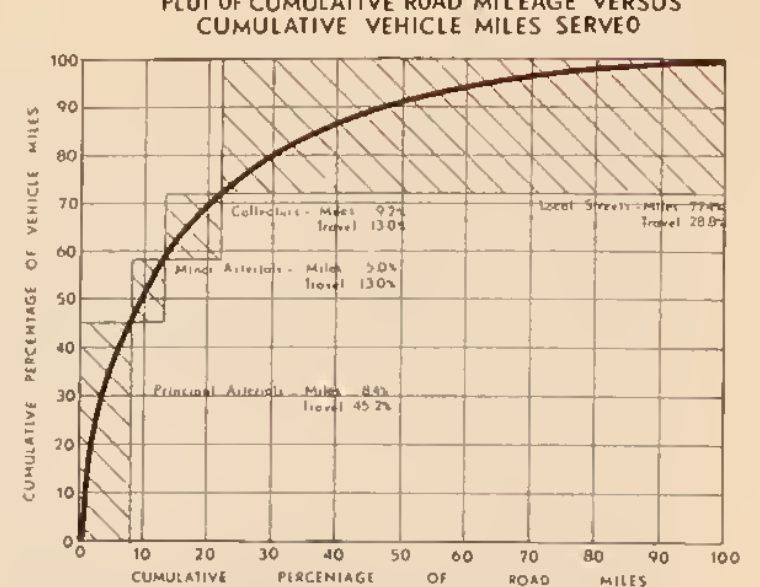
BILLINGS

FIGURE 2



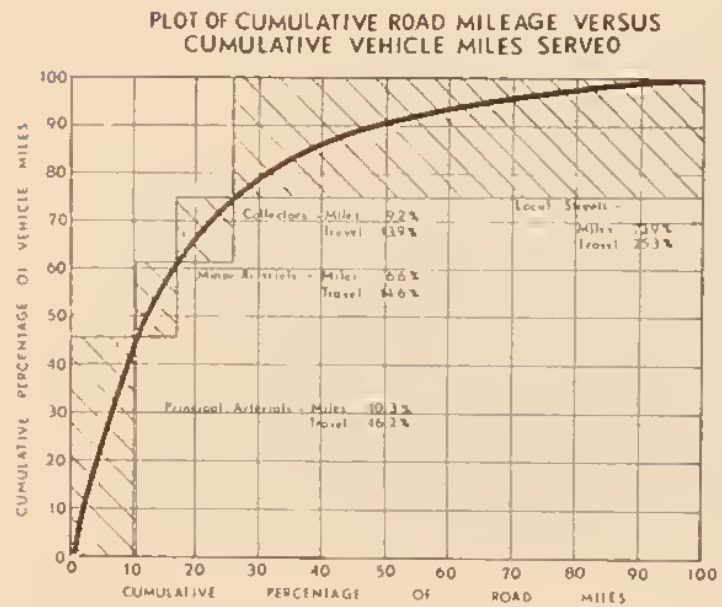
RURAL SYSTEM

FIGURE 4



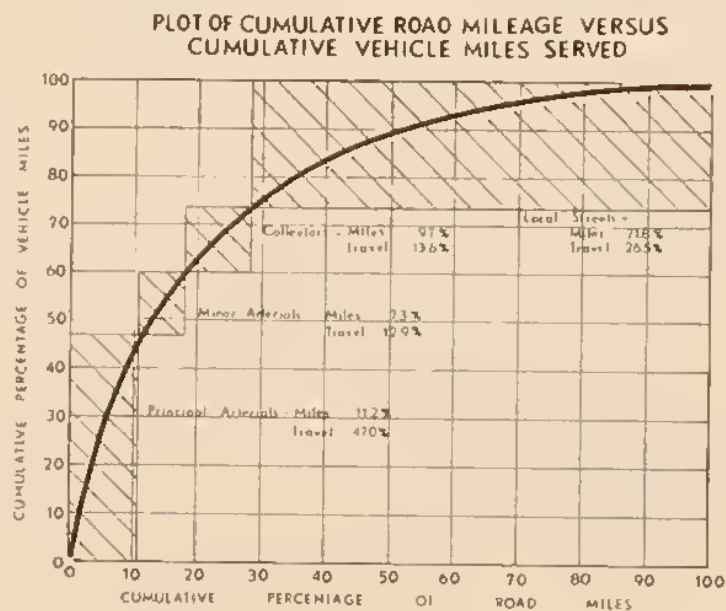
10,000 - 24,999 POP. GROUP

FIGURE 6



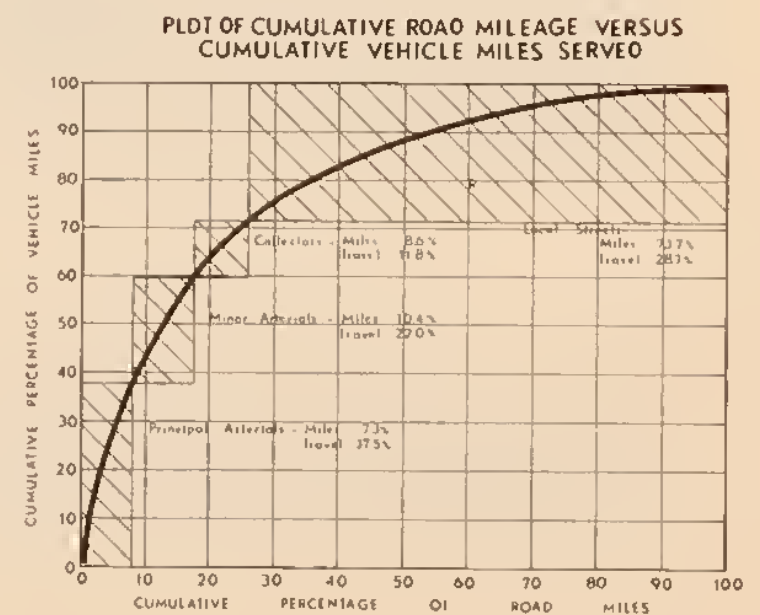
GREAT FALLS

FIGURE 3



5,000 - 9,999 POP. GROUP

FIGURE 5



25,000 - 49,999 POP. GROUP

FIGURE 7

TABLE 15

STATEWIDE AREA, POPULATION, MILEAGE, AND TRAVEL SUMMARY

I. Stato namo Montana State codo : 2 / 4
1 2

IL Land area (square miles)

State total ;	1	4	5	7	3	6	
	4					9	
Rural ;	1	4	5	5	9	9	
	11					16	
Urban ;				1	3	7	
	18					22	

111. 1968 population (thousands)

State total :	23	6	9	3	28
Rural :	30	3	3	7	34
Urban :	36	3	5	6	41

IV. 1968 street and highway mileage 1/

Stato total : 43 67629 46

V. 1988 daily vehicle miles of travel (thousands)

State total : 50 1 1 2 1 1 57

Card identification code
$$\begin{array}{r} 99 \\ 79 \quad 80 \end{array}$$

1/The total 1968 street and highway mileage is that reported on PR-528--Summary of Existing State and Local Roads and Streets as of December 31, 1968, with the exception of primitive road and trail mileage. Adjustments will also be necessary in some states to include frontage road mileage.



RURAL DATA SUMMARY

[illegible]

State Nurse _____ Montana _____

Rural Land Area (Sq. M.) 145599

<p> Total Population (thousands) <table border="1"> <tr> <td></td> <td></td> <td>337</td> </tr> </table> </p>			337
		337	

TABLE 18

SMALL URBAN AREA DATA SUMMARY — 10,000 TO 24,999 POPULATION

Fed Number	Urban Functional Classification	Total																		Federal-aid primary						Federal-aid secondary						Non-federal-aid														State Code
		Mileage						Travel						Miles	Daily vehicle miles of travel (thousands)	Miles	Daily vehicle miles of travel (thousands)	Miles	Daily vehicle miles of travel (thousands)	Miles	Daily vehicle miles of travel (thousands)	Miles	Daily vehicle miles of travel (thousands)																							
		Miles	% of Total	Cumulative % of Total	Daily vehicle miles of travel (thousands)	% of Total	Cumulative % of Total	Miles	Daily vehicle miles of travel (thousands)	Miles	Daily vehicle miles of travel (thousands)	Miles	Daily vehicle miles of travel (thousands)											Miles	Daily vehicle miles of travel (thousands)																					
1 2		4 5 6 7 8 9			12 13 14 15 16 17 18 19			22 23 24 25 26			29 30 31 32 33 34 35 36			38 40 41 42 43			46 47 48 49 50 51 52 53			54 57 58 59 60 61			64 65 66 67 68 69 70 71			79 80																				
	Principal arterial system																																													
7 1	Interstate		2	0.5	0.5			4	1.0	1.0		2		4	0	0	0	0	0	0	0	0	0	0	0	0	2 4																			
2 7	Other freeways and expressways		0	0.0	0.5			0	0.0	1.0		0		0		0		0		0			0			2 4																				
7 7	Other principal arterials		33	7.9	8.4			200	44.2	45.2		29		188		2		7		2			5			2 4																				
2 4	Minor arterial street system		21	5.0	13.4			59	13.0	58.2		2		8		6		11		13			40			2 4																				
7 5	Collector street system		38	9.2	22.6			59	13.0	71.2		0		0		5		7		33			52			2 4																				
8 9	Local street system		321	77.4	100.0			130	28.8	100.0		0		0		0		0		321			180			2 4																				
	Total																																													
7 1			415	100.0	-			452	100.0	-		33		200		13		25		369			227			2 4																				

State Name MontanaLand Area (Sq. Mi.) 28Population (thousands) 82Number of urban areas contained in this state 5

CONNECTING LINK SUMMARY

Card Number		Functional Classification	MILEAGE																																TRAVEL (DVM) (THOUSAND)								State Code
			Other freeways and expressways								Other urban principal arterials								Other freeways & expressways				Other urban principal arterials																				
			Connecting links of rural principal arterial system				Connecting links of rural minor arterial system				Connecting links of rural principal arterial system				Connecting links of rural minor arterial system				Connecting links of rural principal arterial system	Connecting links of rural minor arterial system	Connecting links of rural principal arterial system	Connecting links of rural minor arterial system																					
1	2			4	5	6	7	9	8	12	13	14	15	16	17	30	31	22	23	24	25	26	27	28	29	30	31	32	33	34		41	43	50	52	59	61		68		79	80	
7	8	Urban principal arterial system							0						0						2	0								5		0		0		148		15		2	4		

State Name Montana

TABLE 20

[illegible]

State Name Montana

Urbanized Area Name—Billings

Land Area (Sq. Mi.)

Paper used (thousands) 43 64

Number of prime areas compared of 30

CONNECTING LINK SUMMARY

Card Number		Functional Classification	CONNECTING LINK SUMMARY																																	TRAVEL (VYM) (THOUSAND)								State Code	
			MILEAGE																																	Other freeway & expressway				Other urban principal arterials					
			Other freeways and expressways								Other urban principal arterials																																		
			Connecting links of rural principal arterial system				Connecting links of rural minor arterial system				Connecting links of rural principal arterial system				Connecting links of rural minor arterial system				Connecting links of rural principal arterial system				Connecting links of rural minor arterial system				Connecting links of rural principal arterial system				Connecting links of rural minor arterial system														
1	2		4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40						
1	9	Urban principal arterial system						0								0								1	0						3			0			0			98		12		2	4

State Name. Montana

Urbanized Area Name—Billings

INDIVIDUAL URBANIZED AREA DATA SUMMARY

Urbanized Area Name—Great Falls

CONNECTING LINK SUMMARY

Urbanized Area Name—Great Falls

TABLE 22
Rural Mileage and Travel By County

TABLE 22

Rural Mileage and Travel By County

Collector System																									
No.	Miles	Major Collector				Minor System				Total Collector System				Total Classified System				Local Road System				Rural Total			
		%	*DVM	%	Miles	%	*DVM	%	Miles	%	*DVM	%	Miles	%	*DVM	%	Miles	%	*DVM	%	Miles	%	*DVM	%	
1.	139.23	9.3	18,192	12.1	243.11	16.3	11,041	7.3	382.32	26.6	29,233	19.1	541.77	36.3	131,672	86.9	948.83	63.7	19,742	13.1	1,490.60	2.3	150,813	1.7	
2.	178.23	13.2	39,416	16.5	139.25	10.3	9,204	3.9	317.48	23.5	48,620	20.1	468.08	33.9	219,158	91.9	892.57	66.1	19,266	8.1	1,350.65	2.0	238,124	2.8	
3.	113.96	7.1	13,918	9.5	254.81	15.8	15,637	10.7	368.77	22.9	29,555	20.3	506.42	31.4	122,368	83.9	1,106.07	68.6	23,509	16.1	1,612.19	2.4	145,867	1.7	
1.	36.57	5.4	5,802	5.3	93.61	13.8	4,005	1.2	130.18	19.2	16,107	9.5	211.76	31.3	99,038	90.7	465.30	68.7	10,214	9.3	677.06	1.0	109,252	1.3	
5.	90.51	9.1	14,617	8.6	115.01	11.5	6,394	3.8	205.52	20.7	21,011	21.2	359.76	30.2	156,384	92.2	632.90	63.8	13,270	7.8	992.65	1.5	169,751	2.0	
6.	121.55	14.8	8,162	14.5	138.64	16.9	6,863	12.2	260.19	31.8	15,025	26.7	382.40	46.7	46,624	83.0	436.56	53.3	9,582	17.0	818.96	4.2	56,206	0.6	
7.	133.78	7.6	33,229	9.1	273.82	15.6	30,787	8.1	607.60	23.2	64,016	17.6	592.07	33.7	340,114	93.3	1,166.82	66.3	24,499	6.7	1,758.89	2.7	364,613	1.2	
8.	217.64	9.1	24,912	14.7	422.73	17.7	23,004	13.6	640.37	23.9	47,916	28.3	769.79	31.8	133,938	79.2	1,627.44	68.2	35,123	20.8	2,087.23	3.6	169,062	2.0	
9.	127.54	12.0	11,676	7.9	179.72	17.0	10,976	7.3	307.26	20.0	22,651	15.1	465.94	41.0	137,567	91.8	591.12	56.0	12,330	8.2	1,659.06	1.6	149,897	1.7	
10.	34.25	4.0	4,772	9.6	170.25	19.5	9,413	1.9	204.50	23.4	14,186	28.4	256.12	32.7	37,038	74.2	587.64	67.3	12,906	25.8	873.76	1.3	49,941	0.6	
11.	104.96	8.6	17,166	10.1	223.18	18.2	15,483	9.1	328.14	26.8	32,649	19.2	453.08	37.0	151,508	90.7	779.67	63.0	15,873	9.3	1,223.75	1.9	170,481	2.0	
12.	40.17	12.4	14,847	14.5	52.18	16.1	5,385	5.4	92.35	28.4	20,232	20.2	145.13	41.7	96,528	96.1	179.89	56.3	3,870	3.9	325.02	0.5	100,398	1.2	
13.	59.95	6.3	6,770	9.6	188.20	19.7	8,117	11.5	218.15	25.9	6,587	9.7	334.19	34.9	57,591	81.4	623.57	65.1	13,137	16.6	958.06	1.5	70,731	0.8	
14.	102.50	5.5	17,989	10.0	237.97	12.8	16,509	9.2	340.47	18.3	34,398	19.3	561.73	30.2	151,246	84.5	1,299.64	70.9	27,771	15.5	1,861.34	2.8	179,017	2.1	
15.	107.37	5.5	51,491	12.8	218.54	14.1	31,270	7.8	325.91	16.6	82,761	20.6	547.80	27.9	370,896	92.1	1,116.28	72.1	30,652	7.6	1,364.08	3.0	101,048	1.6	
16.	63.24	4.5	35,307	10.4	181.78	13.3	30,809	9.1	245.02	17.8	65,116	19.1	663.59	33.3	319,785	94.1	928.16	66.7	20,158	5.9	1,391.75	2.1	389,943	3.9	
17.	85.85	6.7	4,102	6.6	284.81	22.3	11,038	16.5	370.72	29.0	15,340	23.1	506.81	39.7	50,763	75.9	771.86	60.1	16,188	24.2	1,278.67	1.9	66,951	0.8	
18.	146.49	15.3	39,313	21.9	177.64	18.7	16,879	9.4	323.13	34.4	56,192	31.2	470.74	49.7	165,920	92.1	477.39	50.4	14,071	7.8	948.13	4.4	179,991	2.1	
19.	53.14	8.4	3,380	7.1	125.47	19.7	3,071	6.5	178.61	28.1	6,151	13.6	220.17	34.6	38,737	81.6	115.67	65.4	8,708	18.1	635.84	1.0	47,445	0.5	
20.	65.92	10.3	8,062	6.8	43.99	6.9	3,085	2.6	109.91	17.1	11,117	9.1	203.99	31.8	108,837	92.1	437.26	68.2	9,521	7.9	641.25	1.0	118,168	1.4	
21.	176.65	8.0	19,891	11.3	361.63	16.7	17,204	9.8	540.28	24.7	37,098	21.2	663.69	30.4	143,106	81.8	1,521.01	69.6	31,920	18.2	2,181.10	3.3	175,026	2.0	
22.	18.37	2.7	4,965	2.6	79.27	10.2	6,301	3.6	97.64	12.6	11,266	6.0	257.67	33.1	176,710	94.2	520.27	66.9	10,822	5.8	777.94	4.2	187,532	2.2	
23.	57.80	5.5	5,672	5.3	167.22	10.6	7,392	6.9	225.02	21.3	13,064	12.2	302.82	28.7	91,243	85.3	752.59	71.3	15,783	11.7	1,655.11	1.6	107,026	1.2	
24.	52.46	4.1	18,538	7.3	144.83	12.1	11,390	4.5	197.29	16.5	29,923	11.8	346.86	29.0	234,336	92.6	849.69	71.0	18,750	7.1	1,196.55	1.8	253,085	2.9	
25.	106.92	8.9	39,810	16.6	265.16	22.0	23,548	9.3	372.38	30.9	63,368	24.9	538.07	41.7	240,852	94.7	666.13	55.3	13,556	5.3	1,204.20	1.8	254,438	2.9	
26.	113.50	12.7	11,311	20.5	157.57	17.4	7,596	13.7	271.07	30.9	18,907	34.2	296.66	32.8	41,842	76.7	406.80	67.2	13,160	21.3	904.16	1.4	55,302	0.6	
27.	82.57	4.1	8,348	1.1	210.38	10.5	14,964	7.1	202.95	14.7	22,312	11.5	62.52	24.2	167,027	92.1	1,512.90	75.8	36,659	17.6	1,995.12	3.0	202,656	2.3	
28.	69.27	5.2	6,806	7.5	223.75	16.7	10,172	11.6	293.02	21.8	17,278	19.1	143.57	33.1	70,530	78.1	897.59	66.9	19,772	21.9	1,311.07	2.0	90,402	1.1	
29.	47.16	1.2	3,068	2.2	220.70	15.7	12,191	8.9	237.86	16.9	15,259	11.1	125.40	30.2	116,968	85.0	981.15	69.8	20,590	15.9	1,406.94	2.2	137,358	1.6	
30.	52.85	7.2	6,716	10.2	140.10	19.2	3,533	5.4	192.95	26.1	10,249	15.6	295.02	40.7	55,961	85.1	435.94	59.6	9,569	14.6	730.96	1.1	65,530	0.8	
31.	22.90	2.7	9,494	5.9	80.44	9.4	3,476	2.0	103.34	12.3	12,970	7.6	188.04	22.4	156,829	92.3	652.85	77.6	13,285	7.8	840.56	1.3	170,105	2.0	
32.	44.00	2.9	13,822	3.2	130.43	8.6	29,513	6.9	171.13	11.6	13,335	10.2	382.85	25.1	102,877	94.1	1,125.13	74.6	21,017	5.6	1,500.28	2.3	426,894	4.9	
33.	25.76	2.6	2,603	2.7	238.57	24.0	9,888	10.2	264.33	26.5	12,491	12.9	365.64	36.7	83,691	96.2	639.22	63.3	13,357	13.8	995.86	1.5	96,938	1.1	
34.	50.88	5.1	7,552	4.0	123.00	12.2	10,793	57.5	173.88	17.3	18,315	9.8	320.73	31.9	172,538	92.0	686.18	68.1	15,071	8.0	1,006.91	1.6	187,612	2.2	
35.	56.92	10.0	2,730	8.8	87.18	15.3	2,125	6.8	111.10	25.3	4,355	15.6	206.81	36.2	23,428	75.5	363.81	63.8	7,619	21.5	570.65	0.9	31,047	0.4	
36.	13.83	2.6	5,708	4.4	373.41	22.0	17,680	13.6	417.24	24.6	21,488	18.0	606.92	35.7	105,781	81.5	1,094.91	61.3	21,000	18.5	1,698.83	2.6	129,781	1.5	
37.	114.28	10.7	23,425	18.4	136.06	12.8	8,538	6.																	

TABLE 23
Urban Mileage and Travel

No.	Urbanized Areas Over 50,000 Population	Interstate				Other Principal Arterials				Total Principal Arterials				Minor Arterials			
		Miles	%	*DVM	%	Miles	%	*DVM	%	Miles	%	*DVM	%	Miles	%	*DVM	%
1.	Great Falls	1.54	1.6	18,243	3.4	24.07	8.69	229,166	42.8	28.61	10.3	247,409	46.2	18.50	6.6	78,206	14.6
2.	Billings	4.67	1.5	13,514	2.6	24.46	7.63	214,333	35.8	29.13	9.1	227,847	38.0	26.90	8.4	128,647	21.5
	Total Urbanized Areas	9.21	1.5	31,757	2.8	48.53	8.1	443,499	39.1	57.74	9.6	475,256	41.9	45.40	7.6	206,853	18.2
	25,000 to 49,999 Population																
3.	Missoula	2.87	1.2	13,450	3.2	11.42	4.9	136,561	32.3	14.29	6.1	160,011	35.6	26.95	11.5	101,169	23.9
4.	Butte	4.99	2.9	16,632	2.5	10.17	6.0	84,248	34.0	15.16	8.9	100,880	40.7	14.93	8.8	46,465	18.7
	Total	7.86	1.9	30,082	4.5	21.59	5.4	220,809	33.0	29.45	7.3	260,891	37.4	41.88	10.4	147,634	22.0
	10,000 to 24,999 Population																
5.	Helena	2.00	1.9	4,280	2.8	9.49	6.6	62,137	41.2	11.49	7.9	66,417	44.1	4.65	3.2	21,763	14.4
6.	Kalispell					7.81	10.7	49,910	50.2	7.81	10.7	49,910	50.2	6.01	8.3	9,257	9.3
7.	Bozeman					3.92	5.1	36,292	36.7	3.92	5.1	36,292	36.7	5.80	7.6	17,751	18.0
8.	Havre					6.04	10.8	29,814	53.7	6.04	10.8	29,814	53.7	1.91	3.4	3,599	6.5
9.	Miles City					5.40	8.5	21,438	45.1	5.40	8.5	21,438	45.1	2.47	3.9	6,559	13.9
	Total	2.0	0.5	4,280	0.9	32.66	7.9	199,594	44.1	34.66	8.4	203,871	45.1	20.84	5.0	58,929	13.0
	5,000 to 9,999 Population																
10.	Anaconda					5.15	19.2	23,804	50.4	5.75	19.2	23,804	50.4	1.47	4.9	4,343	9.2
11.	Glasgow					2.56	7.6	12,381	45.9	2.56	7.6	12,381	45.9	3.26	9.6	4,077	15.1
12.	Livingston					3.17	7.9	15,904	47.6	3.17	7.9	15,904	47.6	3.16	7.9	4,847	14.5
13.	Lewistown					4.90	10.0	15,727	43.5	4.91	10.0	15,737	43.5	3.44	7.0	5,086	14.1
14.	Glendive					2.43	8.9	11,961	31.3	2.43	8.9	11,961	31.3	2.16	7.9	7,960	20.8
15.	Libby					7.19	14.7	30,673	62.0	7.19	14.7	30,673	62.0	4.42	9.1	3,392	6.9
16.	Laurel	0.62	1.0	2,561	5.8	4.54	14.1	18,583	42.1	5.16	16.1	21,144	47.9	0.85	2.6	4,420	10.0
17.	Deer Lodge					1.30	4.8	4,791	44.6	1.30	4.8	4,791	44.6	1.95	7.2	1,623	15.1
18.	Cut Bank					2.28	11.6	8,472	37.4	2.29	11.7	8,472	37.4	1.66	8.4	4,176	19.8
	Total	0.64	0.02	2,561	0.8	34.12	11.1	142,306	45.1	34.76	11.3	144,867	46.9	22.37	7.3	40,224	13.1
	Total Urban Areas	19.71	1.1	68,679	2.7	136.90	7.9	1,006,204	39.2	155.61	9.1	1,074,883	41.9	130.49	7.6	453,636	17.7
	Guidelines																
				* DVM	Daily Vehicle Miles							5.10				40.55	

TABLE 23
Urban Mileage and Travel

No.	Total Arterial System				Collector				Total Classified System				Local Street System				Total Urban System			
	Miles	%	*DVM	%	Miles	%	*DVM	%	Miles	%	*DVM	%	Miles	%	*DVM	%	Miles	%	*DVM	%
1.	47.11	17.0	325,515	60.9	26.45	9.2	74,174	13.9	72.56	26.2	399,789	71.7	204.74	73.9	135,339	25.3	277.30	16.1	535,128	20.9
2.	56.03	17.5	356,494	69.5	35.59	11.1	96,099	16.0	91.72	28.6	452,503	75.5	228.98	71.1	146,606	24.5	320.70	18.6	699,108	23.3
	103.14	17.2	682,109	69.1	61.14	10.2	170,183	15.0	164.28	27.5	852,292	75.1	133.72	72.6	281,945	24.9	598.00	34.7	1,134,236	14.2
3.	41.24	17.6	251,180	59.5	19.47	8.3	49,773	11.8	60.71	25.9	300,953	71.3	173.29	74.1	121,187	28.7	234.00	13.6	422,138	16.5
4.	30.09	17.8	147,345	59.4	15.33	9.1	29,450	11.9	35.42	26.8	176,796	71.3	123.88	73.2	71,056	28.7	169.39	9.8	247,850	9.6
	71.33	17.7	398,625	59.5	34.80	8.6	79,223	11.8	106.13	26.3	477,748	71.3	297.17	73.7	192,243	28.7	403.30	23.4	669,988	26.1
5.	16.14	11.1	88,180	58.5	12.13	8.5	19,602	13.0	28.57	19.6	107,782	71.5	116.92	80.3	42,972	28.5	145.19	8.4	150,753	5.9
6.	13.82	19.0	59,167	59.5	9.03	13.2	12,150	12.2	23.45	32.2	71,317	71.8	49.29	67.8	28,016	28.2	72.74	4.2	99,362	3.8
7.	9.72	12.7	54,043	61.7	8.00	10.5	15,378	15.6	17.72	23.2	69,421	70.3	58.73	76.8	29,358	30.0	75.15	1.4	98,779	3.8
8.	7.95	11.2	33,113	60.2	3.36	6.0	5,690	10.2	11.31	20.2	39,103	70.4	41.64	80.0	16,428	29.6	55.95	3.2	55,531	2.2
9.	7.87	12.3	27,997	58.9	4.85	7.6	6,300	13.2	12.72	20.0	34,297	72.1	51.14	89.0	13,277	27.9	63.86	3.7	47,574	1.9
	55.59	13.4	262,800	58.1	38.27	9.2	59,120	13.1	93.77	22.7	321,920	71.2	320.72	77.4	139,681	28.8	414.19	24.0	451,999	17.6
10.	7.22	24.1	28,117	59.6	4.11	14.7	6,599	13.8	11.63	38.9	34,656	73.4	18.28	61.2	12,555	26.6	29.91	1.7	47,210	1.8
11.	5.82	17.2	16,458	61.0	2.25	6.7	2,165	9.1	8.07	23.9	18,923	70.1	25.73	76.1	8,076	29.9	33.80	2.0	26,999	1.1
12.	6.33	16.8	20,751	62.1	4.32	10.8	3,541	10.6	10.65	26.6	24,292	72.7	29.37	73.4	9,105	27.3	10.02	2.3	33,396	1.3
13.	8.35	17.0	20,823	67.6	3.04	6.2	5,563	15.4	11.39	23.2	26,386	73.0	37.64	76.8	9,784	27.1	19.03	2.8	36,169	1.1
14.	4.59	16.8	19,921	52.1	2.74	10.0	7,798	20.4	7.33	26.8	27,719	72.5	20.06	73.2	10,526	27.5	27.39	1.6	38,245	1.5
15.	11.61	23.8	31,065	68.8	5.00	10.3	4,833	9.8	16.61	34.1	38,898	78.6	32.17	65.9	10,581	21.1	18.78	2.8	49,481	1.9
16.	6.01	18.7	25,564	57.9	4.25	13.2	6,397	14.5	10.26	32.0	31,961	72.1	21.85	68.2	12,192	27.6	32.11	1.9	44,152	1.7
17.	3.25	12.0	6,414	59.7	2.69	9.9	2,068	19.3	5.94	21.8	8,482	79.0	21.26	78.1	2,254	21.0	27.20	1.6	10,736	0.6
18.	3.95	20.1	12,948	57.2	1.25	6.4	2,785	12.3	5.20	26.5	15,733	69.5	14.14	73.5	6,902	39.5	19.64	1.1	22,635	0.9
	51.13	18.6	185,091	60.0	29.95	9.7	41,959	13.6	87.08	28.3	227,050	73.5	220.80	71.8	81,978	24.6	307.88	17.9	309,979	12.1
	287.10	16.7	1,528,519	59.6	164.16	9.5	359,483	13.7	451.26	26.2	1,879,002	73.2	1,272.41	73.2	686,200	26.8	1,723.67	100	2,565,202	100
		15.25		65.75		5.10		5.10						65.80		15.30				

TABLE 24
Rural & Urban Mileage and Travel By County

No.	COUNTY	Interstate		Other Principal Arterials		Total Principal Arterials		Minor Arterials		Total Arterials System	
		Miles	DVM	Miles	DVM	Miles	DVM	Miles	DVM	Miles	DVM
1.	Beaverhead	42.54	33,179	44.16	44,946	87.00	78,126	72.46	23,714	159.15	101,839
2.	Big Horn	18.5	36,178	61.28	97,502	79.43	133,770	61.17	36,768	140.30	170,538
3.	Blaine			54.17	75,391	54.17	75,391	83.18	17,112	137.65	92,803
4.	Broadwater			58.10	71,436	58.10	71,436	23.18	11,195	81.58	88,651
5.	Carbon			50.70	68,216	50.70	68,216	103.44	67,257	154.23	135,473
6.	Carter							122.21	31,590	122.21	31,590
7.	Cascade	10.55	97,645	116.62	397,109	157.17	394,354	57.41	106,759	234.68	628,713
8.	Chouteau			73.09	73,461	73.09	73,461	16.33	12,562	119.42	86,023
9.	Custer	29.02	12,504	61.31	60,877	93.33	103,381	73.22	39,532	166.55	142,313
10.	Daniels							81.62	22,853	81.62	22,853
11.	Dawson	16.95	25,171	26.82	58,176	43.77	83,347	85.76	68,433	129.53	111,780
12.	Deer Lodge	3.46	40,808	16.52	62,231	19.98	62,231	39.02	42,212	60.00	104,443
13.	Fallon			43.77	30,642	43.77	30,642	42.57	20,065	86.34	50,707
14.	Fergus			68.22	69,001	68.22	69,001	161.18	68,570	229.61	137,571
15.	Flathead			136.44	215,442	136.44	215,442	99.27	130,610	235.71	346,802
16.	Gallatin	33.83	95,581	114.45	49,922	148.28	268,173	77.01	39,539	225.29	397,712
17.	Garfield							136.09	36,323	136.09	36,323
18.	Glacier			66.63	75,721	66.63	75,721	84.92	46,955	151.55	122,676
19.	Golden Valley							41.56	32,286	41.56	32,286
20.	Granite	10.39	35,384	19.68	48,846	30.07	74,230	64.01	23,460	94.08	97,690
21.	Hill			83.76	126,241	83.76	126,241	47.09	13,180	130.76	139,421
22.	Jefferson	23.93	47,279	76.96	94,980	99.89	142,259	60.14	23,185	160.03	165,441
23.	Judith Basin			57.24	71,257	57.24	71,257	20.56	6,922	77.80	78,179
24.	Lake			78.46	153,813	78.46	153,813	71.11	50,640	149.57	204,413
25.	Lewis and Clark	48.97	70,202	84.86	159,449	133.83	229,651	48.00	36,053	181.83	265,704
26.	Liberty			25.59	22,935	25.59	22,935			25.59	22,935
27.	Lincoln			81.06	107,854	81.06	107,854	129.12	69,926	201.18	177,580
28.	McCone							150.55	53,252	150.55	53,252
29.	Madison			7.28	5,729	7.28	5,729	180.35	46,989	187.63	191,709
30.	Meagher							102.07	45,712	102.07	45,712
31.	Mineral	34.29	64,220	43.56	78,157	77.85	142,377	6.82	1,473	84.67	143,850
32.	Missoula	32.59	114,953	98.51	324,386	131.10	439,339	118.56	171,383	249.66	610,728
33.	Musselshell			46.18	43,225	46.18	43,225	55.13	27,885	101.31	71,110
34.	Park	24.01	53,314	11.48	38,599	35.49	91,913	117.69	83,031	153.18	174,944
35.	Petroleum			4.71	2,068	4.71	2,068	58.03	16,505	62.74	18,573
36.	Phillips			55.91	56,255	55.91	56,255	134.64	26,138	189.68	82,393
37.	Pondera	10.53	17,101	21.26	40,921	31.79	58,025	48.73	21,912	80.52	70,937
38.	Powder River							90.16	50,962	90.16	50,962
39.	Powell	14.55	33,414	78.81	114,630	93.36	148,044	36.30	10,333	129.66	158,377
40.	Prairie			28.54	40,769	28.54	40,769			28.54	40,769
41.	Ravalli			76.73	108,582	76.73	108,582	25.85	3,693	102.58	112,276
42.	Richland							121.41	98,678	121.41	98,678
43.	Roosevelt			86.10	87,608	86.10	87,608	64.70	31,601	147.80	119,209
44.	Rosebud	19.27	28,186	23.13	39,007	12.40	67,493	107.33	42,242	149.73	109,735
45.	Sanders							177.54	86,547	177.54	86,547
46.	Sheridan							93.81	50,757	93.81	50,757
47.	Silver Flow	30.34	93,539	36.91	109,444	67.25	202,983	31.12	53,351	98.37	256,334
48.	Stillwater	12.54	27,692	25.98	60,680	38.62	88,372	22.06	13,879	60.67	102,251
49.	Sweetgrass	14.28	34,380	23.08	50,252	37.36	84,632	28.25	11,183	65.61	95,815
50.	Teton	14.81	22,597	62.99	11,370	21.80	33,967	69.58	43,503	91.36	77,470
51.	Toole	26.35	23,314	61.26	64,727	87.61	88,041			87.61	88,041
52.	Townsend	26.19	37,812			26.19	37,812			26.19	37,812
53.	Valley			80.88	101,101	80.88	101,101	108.92	46,425	189.80	147,526
54.	Wheatland							79.82	52,962	79.82	52,962
55.	Wibaux	15.27	22,749			15.27	22,749	26.22	13,744	41.49	36,493
56.	Yellowstone	51.33	151,587	101.53	347,587	152.86	499,374	67.94	178,138	220.80	677,512
	Rural Total	694.26	1,209,288	2,420.54	4,076,420	3,014.80	5,285,798	4,061.80	2,401,265	7,076.60	7,686,973

TABLE 24
Rural & Urban Mileage and Travel By County

No.	Collector System				Total Collector System		Total Classified System		Local Road & Street System		Total Rural & Urban	
	Miles	DVM	Miles	DVM	Miles	DVM	Miles	DVM	Miles	DVM	Miles	DVM
1.	139.21	18,192	243.11	11,041	382.32	29,233	541.77	131,072	948.83	19,742	1,490.60	150,513
2.	178.23	39,416	139.25	9,204	317.18	48,620	458.08	219,158	892.57	19,266	1,350.46	238,424
3.	113.96	13,918	264.81	15,637	368.77	29,555	506.42	122,358	1,106.07	23,509	1,612.49	145,867
4.	36.57	5,802	93.61	4,605	130.18	10,407	211.76	99,038	465.30	10,214	677.06	109,252
5.	90.51	14,517	115.01	6,394	205.52	21,011	359.75	156,484	632.90	13,270	992.65	169,754
6.	121.55	8,162	138.64	6,863	260.19	15,025	382.40	44,624	136.56	9,582	818.94	54,206
7.	159.23	107,403	273.82	30,787	433.05	138,190	662.83	739,903	1,371.56	159,838	2,036.19	899,741
8.	133.78	24,942	122.73	23,004	260.37	47,916	759.79	133,938	1,527.44	35,123	2,387.23	169,062
9.	132.39	17,976	179.72	10,975	312.11	28,951	478.66	171,864	644.26	25,607	1,422.92	197,171
10.	127.51	4,772	170.25	9,113	297.76	14,185	286.12	37,038	587.64	12,906	873.76	49,944
11.	107.70	24,964	223.18	15,183	330.88	19,117	160.41	182,227	790.73	26,399	1,251.14	208,626
12.	44.58	21,356	52.18	5,385	96.76	26,741	156.76	991,945	198.17	16,125	354.93	147,598
13.	59.95	6,770	188.20	8,117	248.15	6,887	334.49	57,591	623.57	13,137	958.06	70,731
14.	105.54	23,552	237.97	16,509	343.51	49,061	573.12	177,632	1,327.35	37,555	1,910.37	215,186
15.	117.00	63,641	218.54	31,270	335.54	94,911	571.25	441,713	1,465.57	58,698	2,036.82	500,410
16.	71.24	50,685	184.78	30,809	256.02	81,494	481.31	389,206	986.80	49,516	1,168.20	138,722
17.	85.85	4,402	284.81	11,038	370.72	15,440	506.83	50,763	774.86	16,188	1,278.67	66,951
18.	146.74	12,098	177.64	16,879	324.38	58,977	175.91	181,662	491.83	20,973	967.77	292,626
19.	53.14	3,350	125.47	3,071	178.61	6,451	220.17	38,737	115.67	8,708	635.84	47,445
20.	65.90	8,062	13.99	3,085	109.91	11,117	203.99	108,837	437.26	9,321	641.26	118,158
21.	179.01	25,584	354.63	17,201	533.64	42,788	674.40	182,209	1,565.65	48,148	2,240.05	230,557
22.	18.37	4,965	79.27	6,301	97.64	11,266	257.67	176,710	520.27	10,822	777.91	187,532
23.	57.80	6,672	167.22	7,392	225.02	13,064	302.82	91,213	752.59	15,783	1,055.41	107,023
24.	52.46	18,533	144.83	11,399	197.29	29,923	346.86	234,336	849.69	18,750	1,196.55	253,086
25.	119.35	69,412	265.46	23,545	384.81	82,960	566.64	348,664	783.05	56,528	1,319.69	405,191
26.	113.50	11,311	157.67	7,596	271.07	18,907	296.66	11,842	606.80	13,169	903.46	55,302
27.	87.57	13,181	210.38	14,964	297.95	28,115	429.13	205,925	1,545.07	46,243	2,044.24	252,167
28.	69.27	6,806	223.75	10,172	293.02	17,278	113.57	70,530	897.60	19,772	1,344.07	90,302
29.	17.14	3,068	229.76	12,191	237.86	15,259	426.49	119,968	981.15	20,590	1,406.94	137,558
30.	52.85	6,716	140.10	3,533	192.95	19,249	295.02	55,961	435.94	9,569	730.96	65,530
31.	22.90	5,194	80.14	3,476	103.34	12,970	188.01	165,820	652.85	13,285	840.85	170,105
32.	53.17	63,595	130.43	29,513	193.90	93,108	443.56	703,830	1,299.72	145,205	1,443.28	840,032
33.	25.74	2,603	238.57	9,588	264.33	12,494	365.84	83,061	630.22	13,357	995.86	96,958
34.	55.20	11,093	121.09	10,794	176.29	21,886	331.38	196,830	715.55	24,179	1,046.93	221,008
35.	56.92	2,730	87.18	2,125	144.10	4,855	206.84	23,428	363.81	7,619	570.65	31,047
36.	43.83	5,709	373.41	17,680	117.21	23,388	506.92	105,781	1,091.91	21,000	1,698.83	129,781
37.	114.28	23,425	136.06	8,538	250.34	31,963	330.86	111,900	763.18	15,131	1,064.34	127,031
38.	124.30	22,089	252.44	8,878	376.74	30,967	466.90	81,927	583.73	12,820	1,050.63	91,749
39.	21.38	4,059	90.99	7,259	112.37	14,315	242.03	169,695	545.86	13,011	787.89	182,705
40.	22.41	9,990	121.40	5,163	213.81	15,162	242.35	65,941	442.90	9,715	685.25	65,646
41.	50.34	30,094	161.37	19,249	211.71	19,349	314.29	161,615	1,153.62	24,226	1,467.91	185,844
42.	165.06	15,531	140.65	10,329	305.72	25,859	427.13	124,546	875.35	19,407	1,302.48	143,953
43.	178.76	22,630	215.70	10,983	394.46	33,613	542.26	152,922	917.03	19,297	1,459.29	172,119
44.	135.70	20,253	322.04	15,827	457.71	36,080	607.14	143,815	1,060.83	23,194	1,668.27	169,009
45.	106.91	12,649	197.77	8,839	304.71	21,488	482.25	108,035	1,133.82	23,894	1,516.07	131,929
46.	67.22	10,849	235.87	15,635	302.09	26,484	396.30	77,241	831.87	18,301	1,223.80	95,542
47.	20.27	32,133	43.12	7,283	63.29	39,416	161.76	295,750	407.39	76,808	569.16	372,557
48.	117.14	131.55	7,187	248.72	22,409	309.39	124,660	690.23	15,089	999.62	139,749	139,749
49.	53.08	6,317	187.67	9,589	240.72	15,906	306.26	111,721	325.01	7,455	631.27	149,476
50.	131.32	23,404	224.88	8,170	356.20	31,574	417.66	109,011	1,006.99	20,327	1,454.65	129,371
51.	104.39	15,316	261.71	14,664	168.10	29,980	455.71	118,021	909.54	19,057	1,365.25	137,078
52.	59.94	8,452	73.68	2,672	133.62	11,124	164.81	48,936	232.89	4,970	397.59	53,906
53.	97.15	12,160	255.43	11,698	352.58	23,858	542.38	171,384	1,363.33	36,471	1,905.71	207,855
54.	36.13	2,703	97.98	4,459	134.11	6,892	213.93	59,854	320.48	7,051	534.41	66,905
55.	63.49	6,813	74.92	2,914	135.41	8,727	176.90	45,220	374.28	7,908	548.18	63,128
56.	186.64	174,109	188.39	32,552	375.03	206,661	595.83	884,473	1,477.63	185,058	2,083.46	1,069,229
	5,042.56	1,221,753	10,192.24	659,254	15,234.80	1,891,007	22,311.40	9,577,990	49,347.27	1,632,631	67,628.67	11,210,611

V. APPENDICES

Appendix A

STATEWIDE RURAL MILEAGE

The total statewide rural mileage used in this report is the existing mileage, as obtained from the Montana State Highway Commission, less urban area mileage, as calculated; less primitive roads; plus frontage roads, as shown in Table A-1.

Table A-1				
TOTAL STATEWIDE RURAL MILEAGE				
Legend	Source	Debit	Distance In Miles Credit	Balance
Existing Mileage	PR-528 ²			76,437
Urban Areas	Calculated	(1,724)		74,713
Primitive Roads	State Manual ¹	(9,097)		65,616
Frontage Roads	State Manual ²		289	65,905

STATEWIDE DAILY VEHICLE MILES (DVM)

The statewide daily vehicle miles (DVM) was based upon the sale of gasoline in 1968.^a

The total sales to civilian travel was estimated at 356,789,000 gallons, as illustrated by Table A-2.

Table A-2	
GASOLINE USAGE BY NON-MILITARY TRAVEL IN 1968	
	Gasoline Sales In Gallons
Gross Sales ^a	358,993,000
Military Use on Airbases ^a	2,204,000
Net Civilian Use	356,789,000
By using 11.56 miles per gallon ^{1a} and dividing this by 365 days, it was possible to arrive at DVM, as indicated below:	
Gallons	
365 Days	DVM
$\frac{\text{Gallons}}{365 \text{ Days}} \times 11.56 \text{ mi./gal.} = 11,300,000^*$	
* Primitive road daily vehicle miles of travel are included in this figure.	

Appendix B — Population Estimates

INTRODUCTION

An important part of this study was the selection of urban areas; therefore, the Appendix will explain the procedure used in making estimates of population and population densities for the assumed urban-in-fact boundaries.

DEFINING THE URBAN-IN-FACT AREA

Aerial photographs of all cities and towns within the State which could possibly qualify as an urban area were used as base maps upon which both the incorporated city limits and the assumed urban-in-fact boundary were delineated. The total area within the urban-in-fact boundary, including airports and industrial areas, if any, was measured. The 1968 population within the assumed boundary was estimated and the population density computed. The area used to compute the population density included airports, industrial areas and other areas of an urban nature which had no residential population. Areas having a population density of 1,000 persons per square mile are considered urban-in-fact, and areas which are urban-in-fact and have a total 1968 estimated population of 5,000 or more are considered urban areas for the purposes of this study.

1968 POPULATION ESTIMATES OF URBAN AREAS

The 1968 population estimates for urban areas were computed as follows:

1. 1966 estimates of population by counties, obtained from the University of Montana, were prorated to equal the statewide total of 693,000 as published in the United States Bureau of the Census, Series P-25, No. 403, September 19, 1968. The University of Montana's estimate was 702,000 as opposed to 693,000 for the U. S. Bureau of the Census.
2. The prorated County totals were compared with U. S. Bureau of the Census totals for 1960. Increases in County population between 1960 and 1968 were distributed to the cities, decreases to the rural areas.
3. Estimates of the population occurring within the areas lying outside of the incorporated city limits and the assumed urban-in-fact boundaries were computed by counting the number of houses times a constant 3.5 persons per residence, and added to the estimated 1968 municipal population to produce the 1968 estimated urban population.
4. The summation of the estimated 1968 municipal population and the urban-in-fact.
Table B-1 lists the estimated 1968 population for Montana's incorporated cities and towns and the equivalent population for Yellowstone and Glacier National Parks. Urban area population figures are for the urban-in-fact area as opposed to incorporated limits for all other cities and towns listed.

TABLE B-1
RANKING OF URBAN-IN-FACT AREAS BY POPULATION AS OF DEC. 31, 1968
 (National Parks Are Included)

Rank	City	Population	Rank	City	Population	Rank	City	Population
1	Great Falls	67,183	42	Big Timber	1,660	85	Ennis	550
2	Billings	63,537	43	Poplar	1,565	86	Sheridan	539
3	Missoula	40,282	44	Townsend	1,528	87	Twin Bridges	507
4	Butte	39,990	45	White Sulphur Springs	1,519	88	Dulton	504
	Yellowstone Nat. Park	30,000	46	Walkerville	1,453	89	Hysham	494
5	Helena	24,606	47	Boulder	1,394	90	Saco	490
6	Kalispell	17,538	48	Ronan	1,334	91	Richey	480
7	Bozeman	15,929	49	Superior	1,300	92	Opheim	457
8	Havre	12,469	50	Eureka	1,300	93	Joliet	450
9	Miles City	11,065	51	Thompson Falls	1,274	94	Rexford	450
10	Anaconda	9,474	52	Harlem	1,267	95	Medicine Lake	452
	Glacier Nat. Park	8,500	53	Three forks	1,200	96	Froid	418
11	Glasgow	8,371	54	Chester	1,158	97	Denton	410
12	Livingston	7,982	55	Terry	1,140	98	Darby	398
13	Lewistown	7,912	56	Circle	1,117	99	Lima	397
14	Glendive	7,902	57	Philipsburg	1,107	100	Alberton	375
15	Libby	5,814	58	Nashua	1,071	101	Kevin	375
16	Laurel	5,234	59	Belgrade	1,057	102	Brockton	367
17	Deer Lodge	5,178	60	Columbus	1,042	103	Fromberg	367
18	Cur Bank	5,158	61	Fairview	1,006	104	Geraldine	364
19	Sidney	4,564	62	Big Sandy	954	105	Winnett	360
20	Shelby	4,017	63	St Ignatius	940	106	Ryegate	314
21	Dillon	3,800	64	Culbertson	919	107	Dodson	313
22	Wolf Point	3,685	65	Troy	900	108	Westby	309
23	Whitefish	3,065	66	Whitehall	898	109	Bainville	285
24	Hardin	2,789	67	Manhattan	899	110	Melstone	266
25	Conrad	2,665	68	Sunburst	882	111	Plevna	263
26	Hamilton	2,600	69	Bridger	824	112	Flaxville	262
27	Baker	2,365	70	Stevensville	784	113	Hingham	254
28	Chinook	2,326	71	Plains	767	114	Clyde Park	253
29	Polson	2,314	72	Wibaux	766	115	Virginia City	250
30	Red Lodge	2,276	73	Belt	757	116	Outlook	226
31	Malta	2,239	74	Fairfield	752	117	Grass Range	222
32	Columbia Falls	2,233	75	Eklatka	738	118	Winitred	220
33	Plentywood	2,121	76	Vallei	724	119	Moore	216
34	Roundup	2,040	77	Lodge Grass	687	120	Lavina	212
35	Forsyth	2,032	78	West Yellowstone	650	121	Hobson	207
36	Browning	2,011	79	Broadus	623	122	Judith Gap	185
37	Choteau	1,966	80	Standford	615	123	Broadview	160
38	East Helena	1,932	81	Cascade	604	124	Neihart	150
39	Fort Benton	1,887	82	Hot Springs	585	125	Bear Creek	61
40	Harlowtown	1,734	83	Drummond	577	126	Ismay	57
41	Scobey	1,726	84	Jordan	557			

Appendix C

PARKS AND RECREATION AREAS IN MONTANA

The list below is indicative of the many recreation activities offered in Montana. These activities will have an increasing effect on Montana's highways as population, leisure time, mobility, and increased income become a fact in the years ahead.

Parks and recreation areas (Table C-1) were considered in this study. However, the National Forests, Corps of Engineers Parks, and State Parks were scattered throughout the State and led to the assumption that only the two National Parks had sufficient concentration of population to be considered in this study. Furthermore, no information was available on the visitation of the recreation areas other than the National Parks.

	Name 1968 Visitors	Urban Area ^a Equivalent
National Parks		
Glacier National Park	964,000	8,500
Yellowstone National Park	2,186,000	30,000
National Forest		
Beaverhead	DNA	
Bitterroot	"	
Custer	"	
Deer Lodge	"	
Flathead	"	
Gallatin	"	
Helena	"	
Kootenai	"	
Lewis and Clark	"	
Lolo	"	
Corps of Engineers Parks		
Canyon Ferry	DNA	
Clarks Canyon Reservoir	"	
Fort Peck	"	
Fresno Dam	"	
Nelson Reservoir	"	
Painted Rocks Reservoir	"	
Pines	"	
Deadman's Basin Reservoir	"	
Montana State Parks		
Bitterroot Lake	DNA	
Flathead Lake	"	
Hell Creek	"	
Hooper	"	
James Kipp	"	
Lewis & Clark Caverns	"	
Love Pine	"	
Lost Creek	"	
Makoshika	"	
Medicine Parks	"	
Rock Creek	"	
Thompson Falls	"	
Tiber Dam	"	
West Shore	"	
Whitefish Lake	"	
Yellow Bay	"	
DNA—Data not Available		
^a Bureau of Public Roads, National Highway Functional Classification Study, 1969 Ranking Recreation Generators, Figure III-E, P. IV-4		

Appendix D — Economic Considerations

Socio-economic factors for each of Montana's incorporated cities having a population of 3,800 or more were used along with population to determine their rank and group. Although the data available, except for bank assets, applied to the counties, it was assumed that the ranking of counties would be similar to the ranking of cities. The basis for the assumption is that in Montana, each county has only one large city, and that city is the one being ranked. The socio-economic factors used are listed for 21 cities in Table D-1, included herein.

An analysis of Table D-1 shows that the rank order of the cities vary for each Socio-economic factor used. However all cities remain within the same size group as established by population.

Table D-1

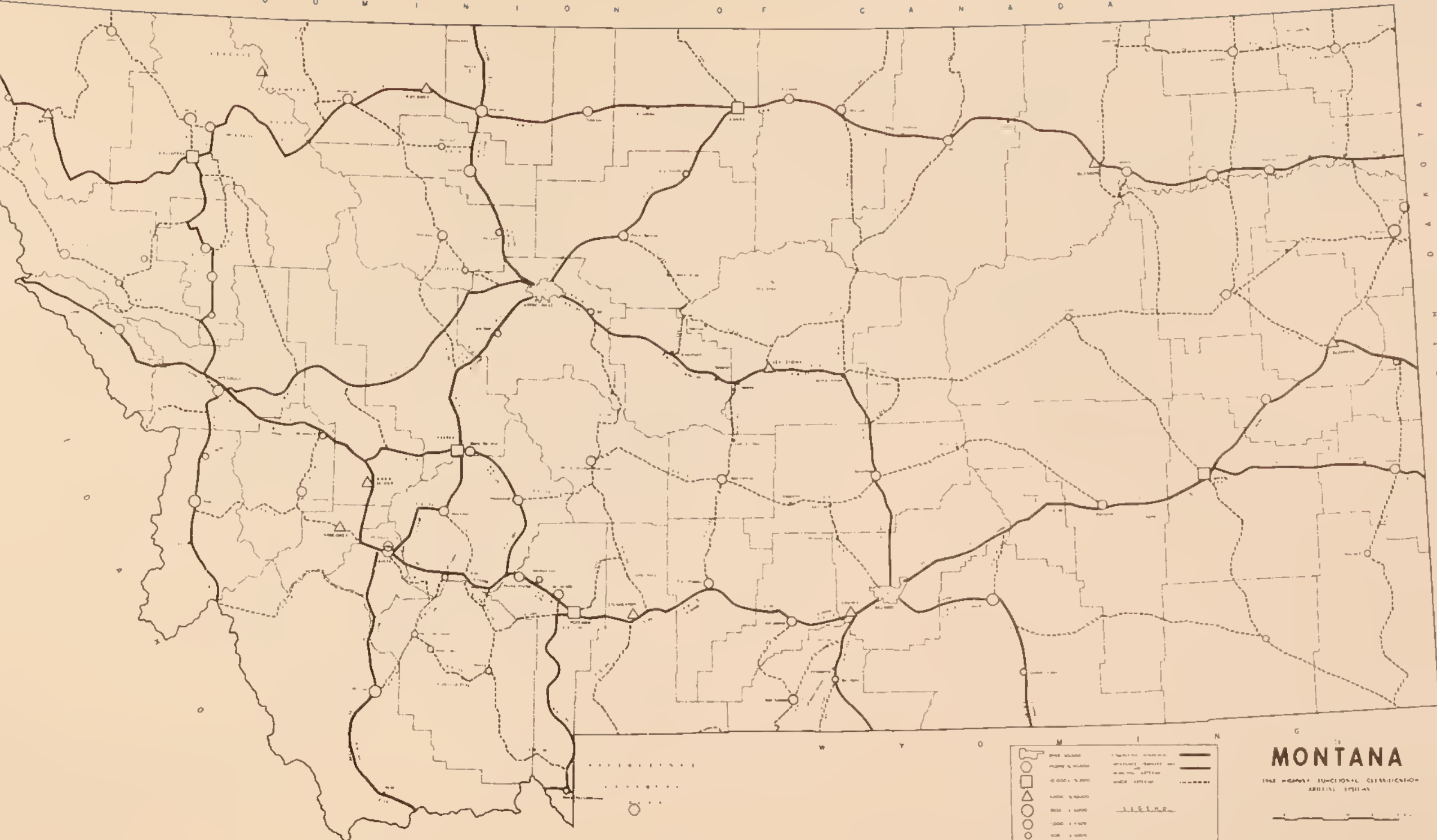
ECONOMIC CONSIDERATION SUMMARY SHEET

Group and Population Range	City	County	Population 1968 (Urban in Part)	Retail Trade (By County) 1965	County Retail Sales Per Capita 1966	County Vehicle Regis- tration 1968	County Median Family Income 1966	County Employ- ment Business 1964	County Per Capita Disposable Income 1966	Rank Among (By City) 1968	State Taxes (By County) 1967	Total Valuation of Counties		Fed. & Outlay Fiscal Year 1968 All Agencies (By County)
												Assessed Value 1967	Taxable Value 1967	
I 50,000 or more	1. Great Falls	Cascade	67,183	\$143,630,000	\$1,706	54,085	\$6,188	15,516	\$2,307	\$201,039,058	\$584,905	\$263,045,961	\$72,106,501	\$101,033,261
	2. Billings	Yellowstone	62,537	149,841,000	1,724	59,676	6,372	18,161	2,403	214,661,065	734,996	330,712,824	92,150,411	66,498,300
	3. Missoula	Missoula	40,282	88,838,000	1,809	38,577	5,978	10,841	2,331	91,977,390	376,650	169,366,479	47,147,264	44,911,281
II 10,000—49,999	4. Butte	Silver Bow	39,990	73,677,000	1,578	25,849	5,431	11,804	2,055	71,344,572	333,492	138,540,940	41,633,721	28,489,176
	5. Helena	Lewis & Clark	24,606	46,809,000	1,523	22,671	6,681	6,224	2,673	104,434,628	262,583	112,614,620	31,966,392	44,385,609
	6. Bozeman	Gallatin	15,929	46,886,000	1,657	21,234	5,602	3,873	2,068	61,094,582	220,724	91,211,286	26,487,251	24,199,558
	7. Kalispell	Flathead	17,588	53,723,000	1,544	29,720	5,617	5,602	2,040	64,892,510	321,239	139,300,096	39,684,513	23,356,453
	8. Havre	Hill	12,469	26,037,000	1,318	12,240	6,559	2,251	2,807	33,812,558	155,631	72,682,098	18,939,751	15,861,829
III 1,000—9,999	9. Miles City	Custer	11,065	23,117,000	1,573	9,065	5,413	2,181	2,119	46,770,168	114,942	44,438,964	12,974,167	11,129,317
	10. Anaconda	Deer Lodge	9,474	16,625,000	899	8,694	5,153	3,073	1,889	35,735,129	116,198	49,171,879	14,057,459	8,095,378
	11. Glasgow	Valley	8,371	23,695,000	1,162	10,960	5,598	1,695	1,995	31,236,366	142,362	59,928,227	16,108,189	33,483,449
	12. Livingston	Park	7,982	16,989,000	1,249	9,956	5,366	1,356	2,013	28,304,765	112,842	44,521,157	10,060,677	6,925,167
	13. Lewistown	Fergus	7,912	25,719,000	1,738	10,637	5,305	1,661	1,989	37,679,595	163,072	65,897,131	18,202,267	12,154,309
	14. Glendive	Hawson	7,902	17,494,000	1,346	9,003	5,772	1,865	1,985	26,746,815	134,140	51,522,777	15,731,778	15,760,398
	15. Cut Bank	Glacier	5,158	14,615,000	1,142	7,112	5,415	1,313	1,868	14,532,328	137,164	48,105,810	16,527,121	13,214,508
	16. Laurel	Yellowstone	5,234	"	1,724	"	6,372	"	2,403	10,053,212	"	"	"	"
	17. Deer Lodge	Powell	5,178	7,127,000	926	5,217	5,622	958	2,127	6,913,687	79,762	27,379,644	8,899,966	3,869,622
	18. Libby	Lincoln	5,814	13,782,000	984	13,019	5,581	2,462	1,834	12,203,925	110,689	50,781,805	14,220,633	61,117,270
	19. Sidney	Richland	4,865	20,943,000	1,939	8,445	4,683	1,420	1,608	23,154,427	118,397	45,974,724	23,154,427	9,228,788
	20. Shelby	Teale	4,017	8,989,000	1,167	5,735	6,370	851	2,389	20,364,097	141,175	49,800,479	20,364,097	6,451,488
	21. Dillon	Beauregard	3,500	13,551,000	1,807	6,127	5,360	871	2,209	21,006,920	121,267	41,302,948	21,006,920	7,264,011

*Note: Yellowstone Co. has two urban areas, Billings & Laurel, Co. totals are only shown for Billings.

O O M I N I O N O F C A N A D A

N O R T H O A K O T A
S O D A

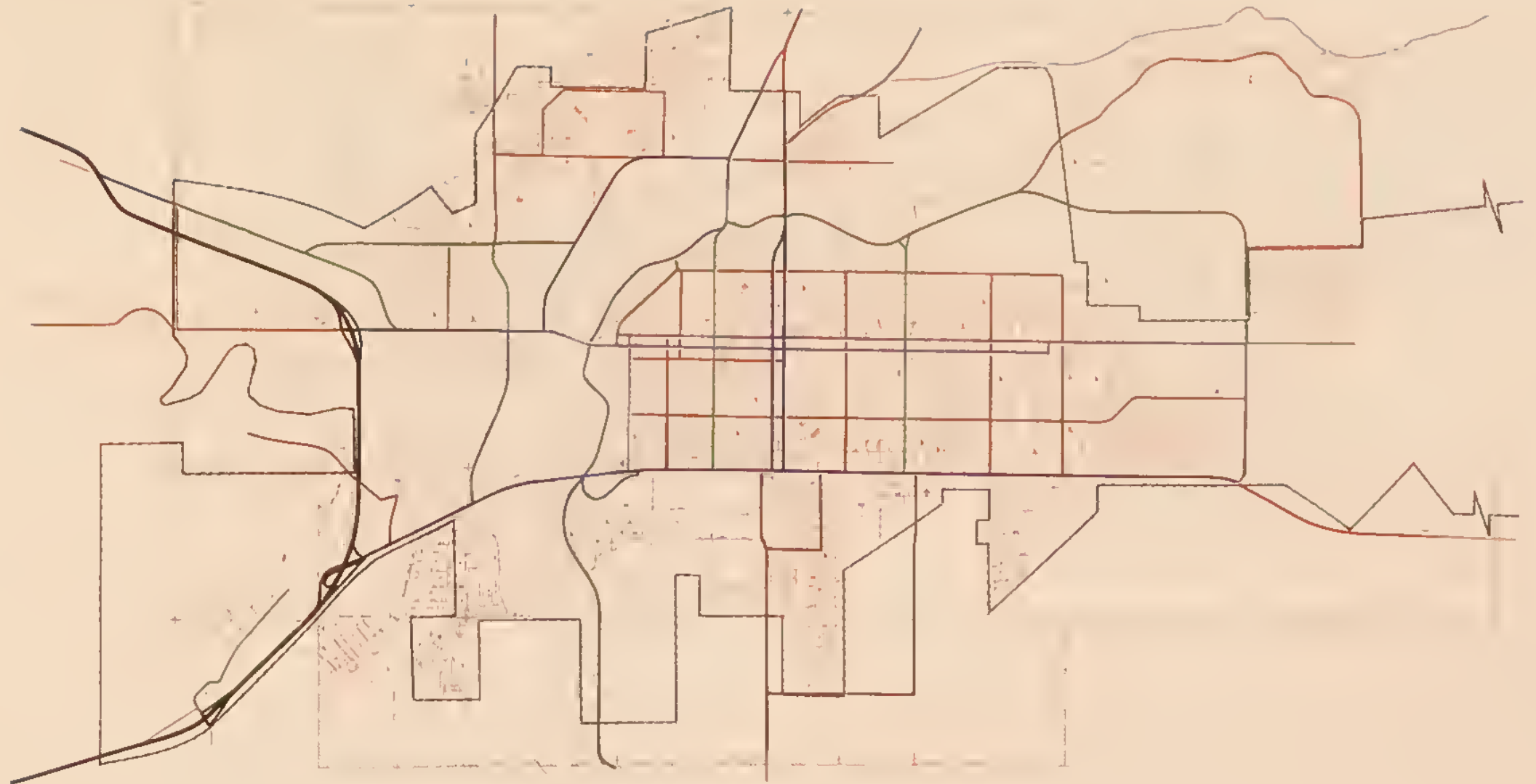


	PRIMARY ROAD		AIRLINE
	SECONDARY ROAD		AIRLINE
	ROAD UNDER CONSTRUCTION		AIRLINE UNDER CONSTRUCTION
	ROAD UNDER CONSTRUCTION		AIRLINE UNDER CONSTRUCTION
	ROAD UNDER CONSTRUCTION		AIRLINE UNDER CONSTRUCTION
	ROAD UNDER CONSTRUCTION		AIRLINE UNDER CONSTRUCTION
	ROAD UNDER CONSTRUCTION		AIRLINE UNDER CONSTRUCTION
	ROAD UNDER CONSTRUCTION		AIRLINE UNDER CONSTRUCTION
	ROAD UNDER CONSTRUCTION		AIRLINE UNDER CONSTRUCTION
	ROAD UNDER CONSTRUCTION		AIRLINE UNDER CONSTRUCTION

MONTANA
1948 HIGHWAY FUNCTIONAL CLASSIFICATION
AIRLINE SYSTEM



- INTERSTATE
- OTHER PRINCIPAL ARTERIALS
- MINOR ARTERIALS
- MAJOR COLLECTORS
- MINOR COLLECTORS
- INTERSTATE
- OTHER PRINCIPAL ARTERIALS
- CONNECTING LINK - OTHER PRINCIPAL ARTERIAL
- CUMULATIVE LINK - OTHER PRINCIPAL ARTERIAL
- OTHER PRINCIPAL ARTERIALS
- MINOR ARTERIAL STREETS
- COLLECTOR STREET
- URBAN INFLUENCE BOUNDARY

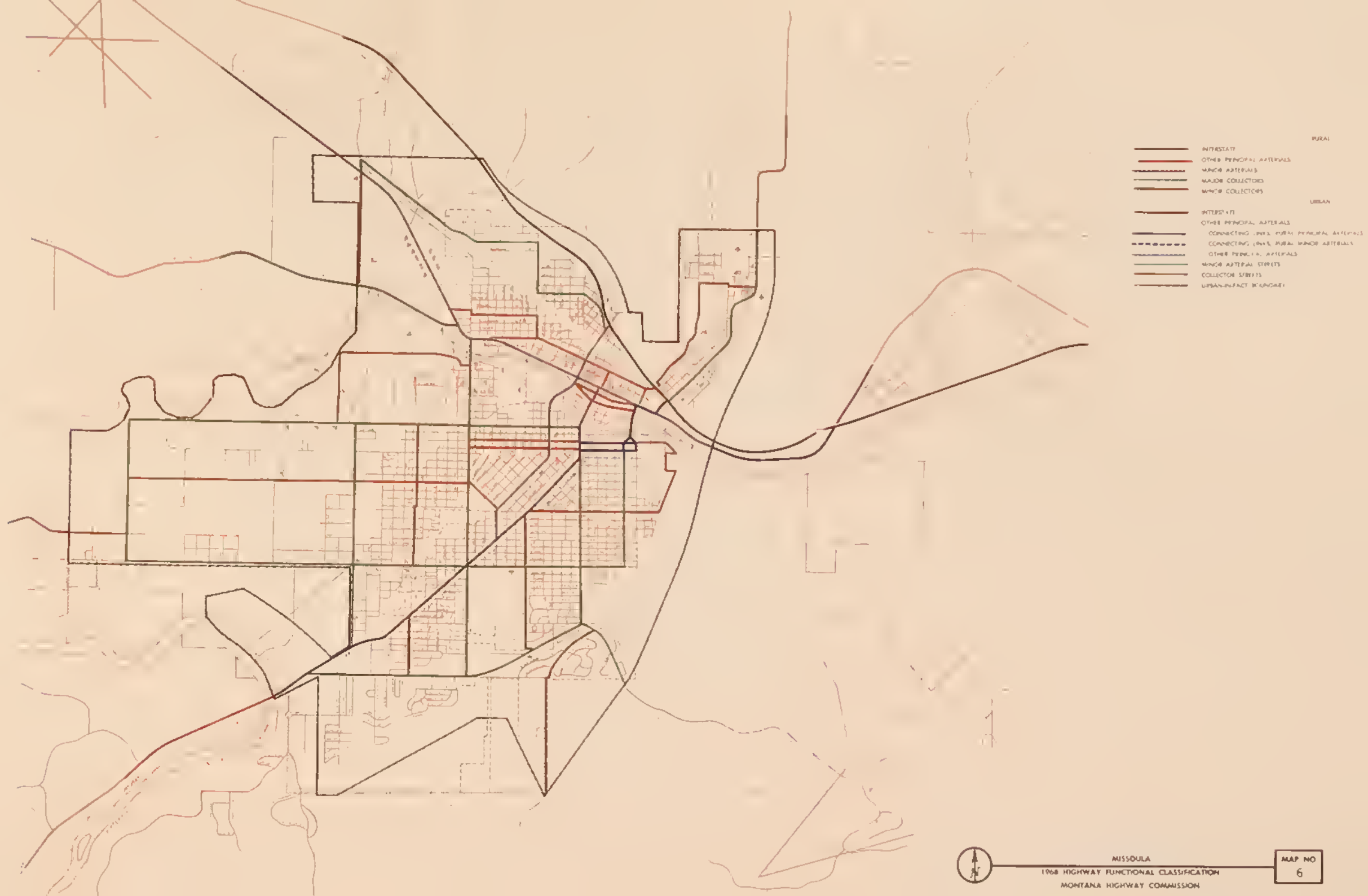


- | | | |
|--|--|-------|
| | INTERSTATE | RURAL |
| | OTHER PRINCIPAL ARTERIALS | |
| | MINOR ARTERIALS | |
| | MAJOR COLLECTORS | |
| | MINOR COLLECTORS | |
| | | URBAN |
| | INTERSTATE | |
| | OTHER PRINCIPAL ARTERIALS | |
| | CONNECTING LINKS (RURAL PRINCIPAL ARTERIALS) | |
| | CONNECTING LINKS (URBAN MAJOR ARTERIALS) | |
| | OTHER PRINCIPAL ARTERIALS | |
| | MINOR ARTERIAL STREETS | |
| | COLLECTOR STREETS | |
| | URBAN-DEVELOPMENT BOUNDARY | |



GREAT FALLS
1961 HIGHWAY FUNCTIONAL CLASSIFICATION
MONTANA HIGHWAY COMMISSION

MAP NO
5



MISSOULA
1968 HIGHWAY FUNCTIONAL CLASSIFICATION
MONTANA HIGHWAY COMMISSION

MAP NO.
6

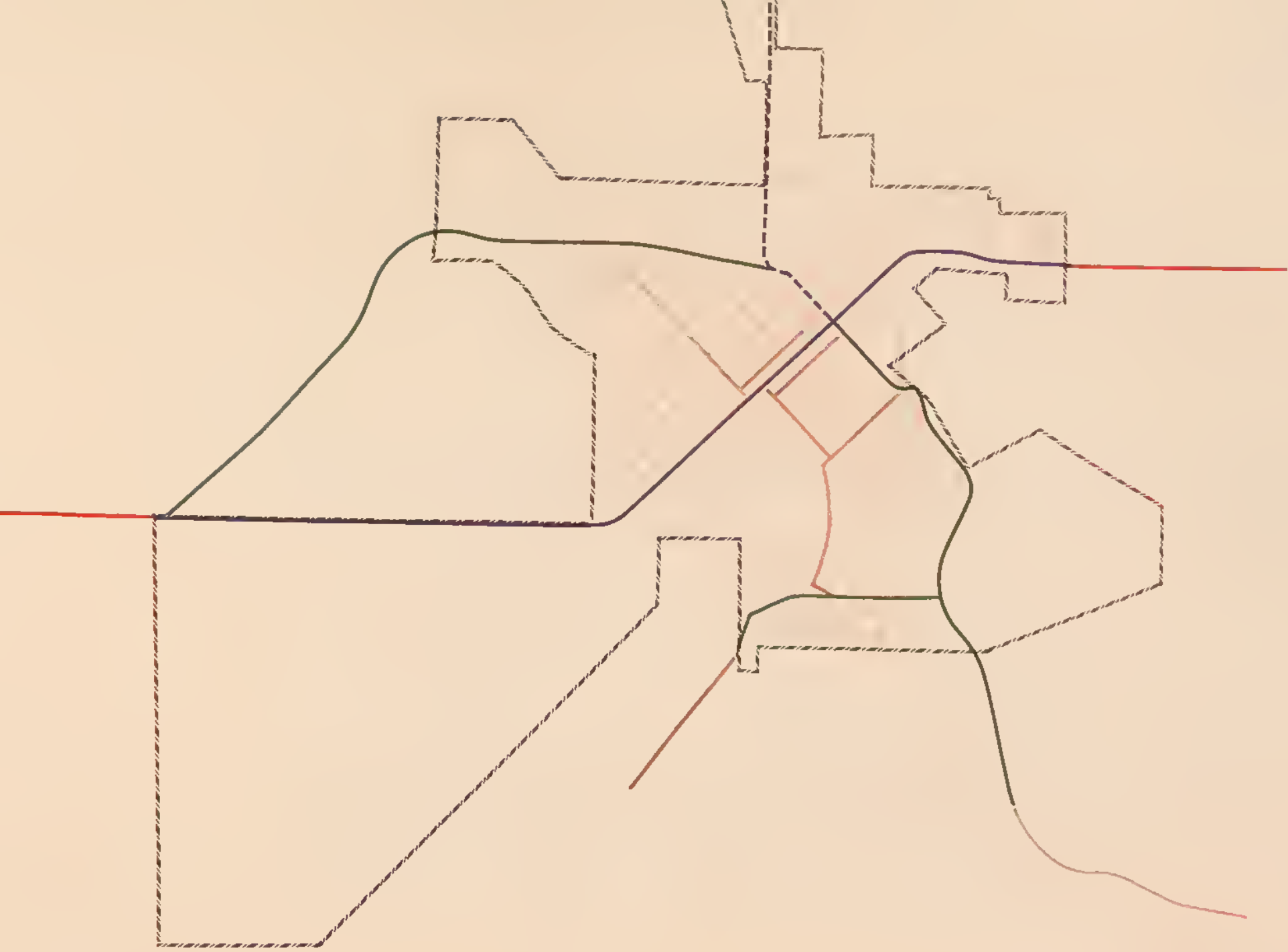


- | | | |
|--|--|-------|
| | INTERSTATE | RURAL |
| | OTHER PRINCIPAL ARTERIALS | |
| | MINOR ARTERIALS | |
| | MAJOR COLLECTORS | |
| | MINOR COLLECTORS | |
| | INTERSTATE | URBAN |
| | OTHER PRINCIPAL ARTERIALS | |
| | CONNECTING LINKS RURAL PRINCIPAL ARTERIALS | |
| | CONNECTING LINKS RURAL MINOR ARTERIALS | |
| | OTHER PRINCIPAL ARTERIALS | |
| | MINOR ARTERIAL STREETS | |
| | COLLECTOR STREETS | |
| | URBAN AREA BOUNDARY | |



HAVRE
1968 HIGHWAY FUNCTIONAL CLASSIFICATION
MONTANA HIGHWAY COMMISSION

MAP NO
7

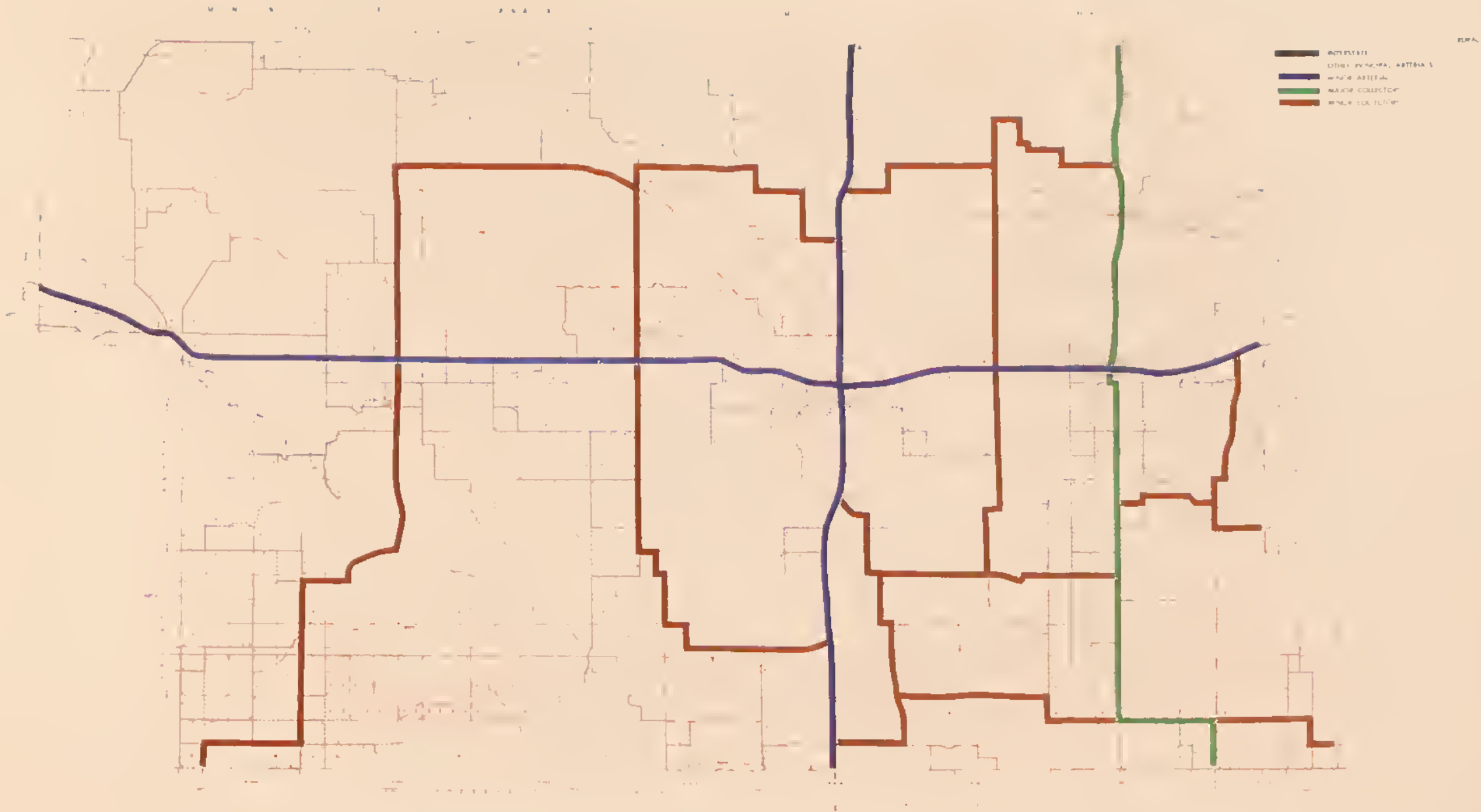


- | | |
|--|-------|
| INTERSTATE | RURAL |
| OTHER PRINCIPAL ARTERIALS | |
| MINOR ARTERIALS | |
| MAJOR COLLECTORS | |
| MINOR COLLECTORS | |
| URBAN | |
| INTERSTATE | |
| OTHER PRINCIPAL ARTERIALS | |
| CONNECTING URBAN RURAL PRINCIPAL ARTERIALS | |
| CONNECTING URBAN RURAL MINOR ARTERIALS | |
| OTHER PRINCIPAL ARTERIALS | |
| MINOR ARTERIAL STREETS | |
| COLLECTOR STREETS | |
| URBAN/IN-FACT BOUNDARY | |

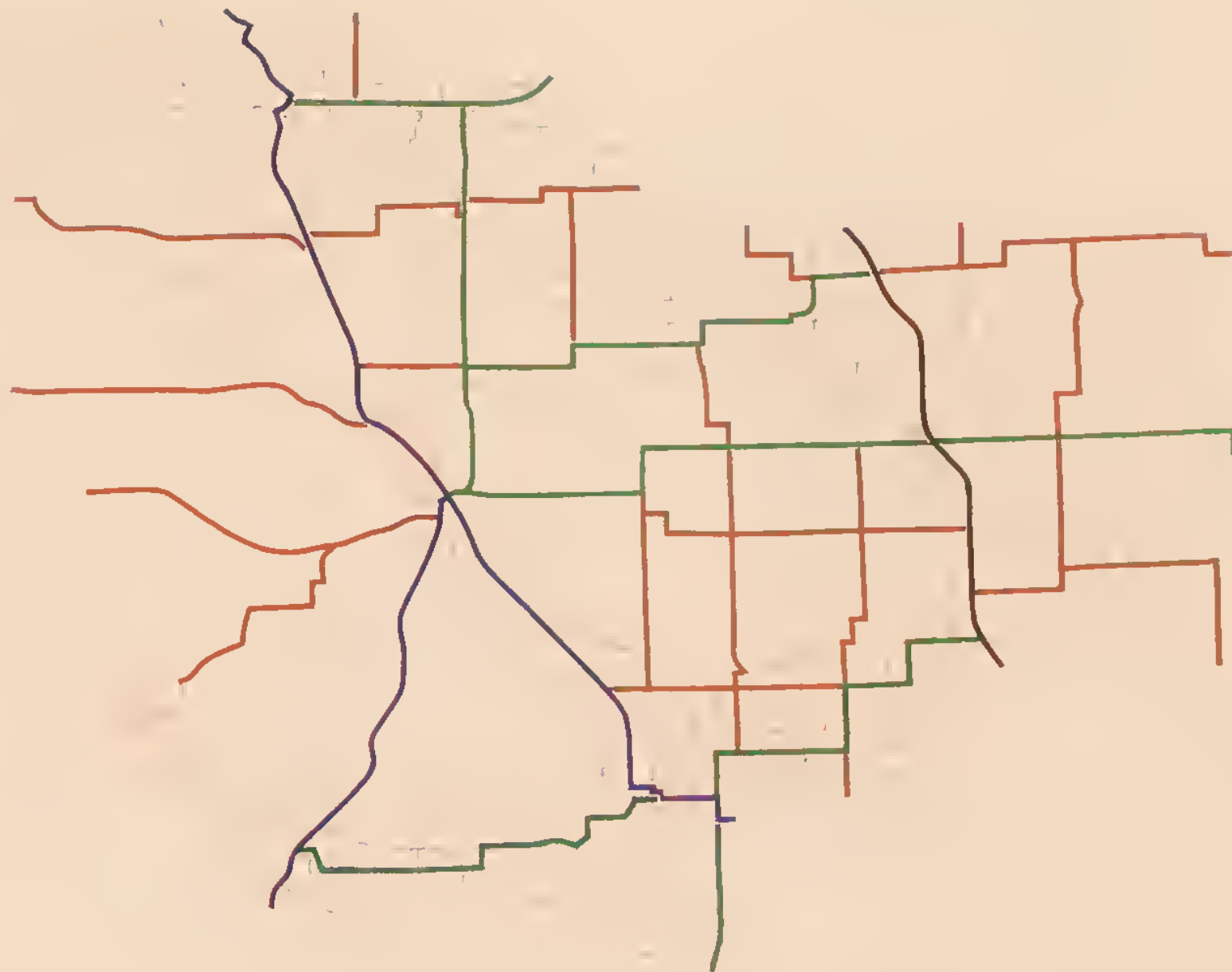


LEWISTOWN
 1968 HIGHWAY FUNCTIONAL CLASSIFICATION
 MONTANA HIGHWAY COMMISSION

MAP NO.
 8

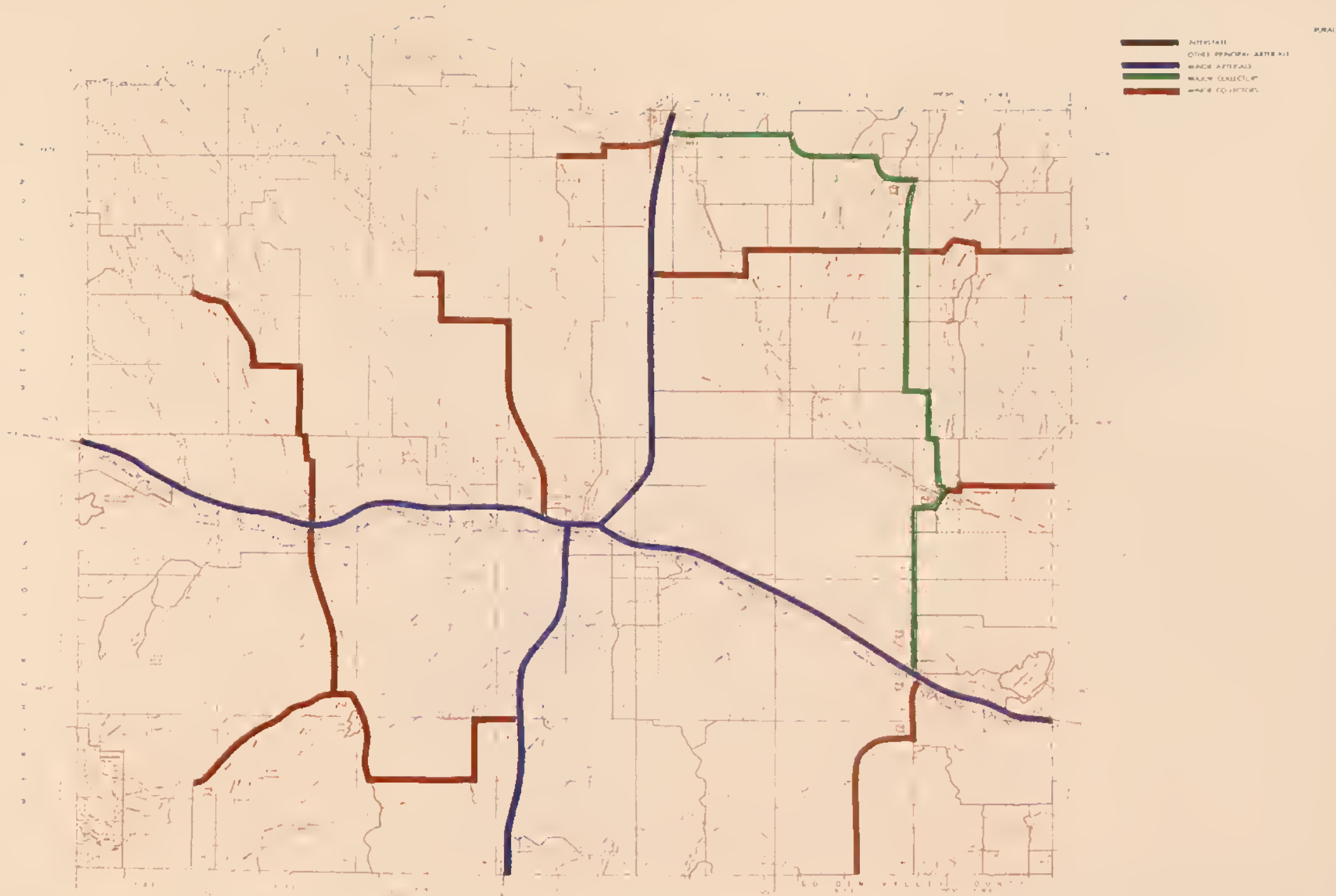


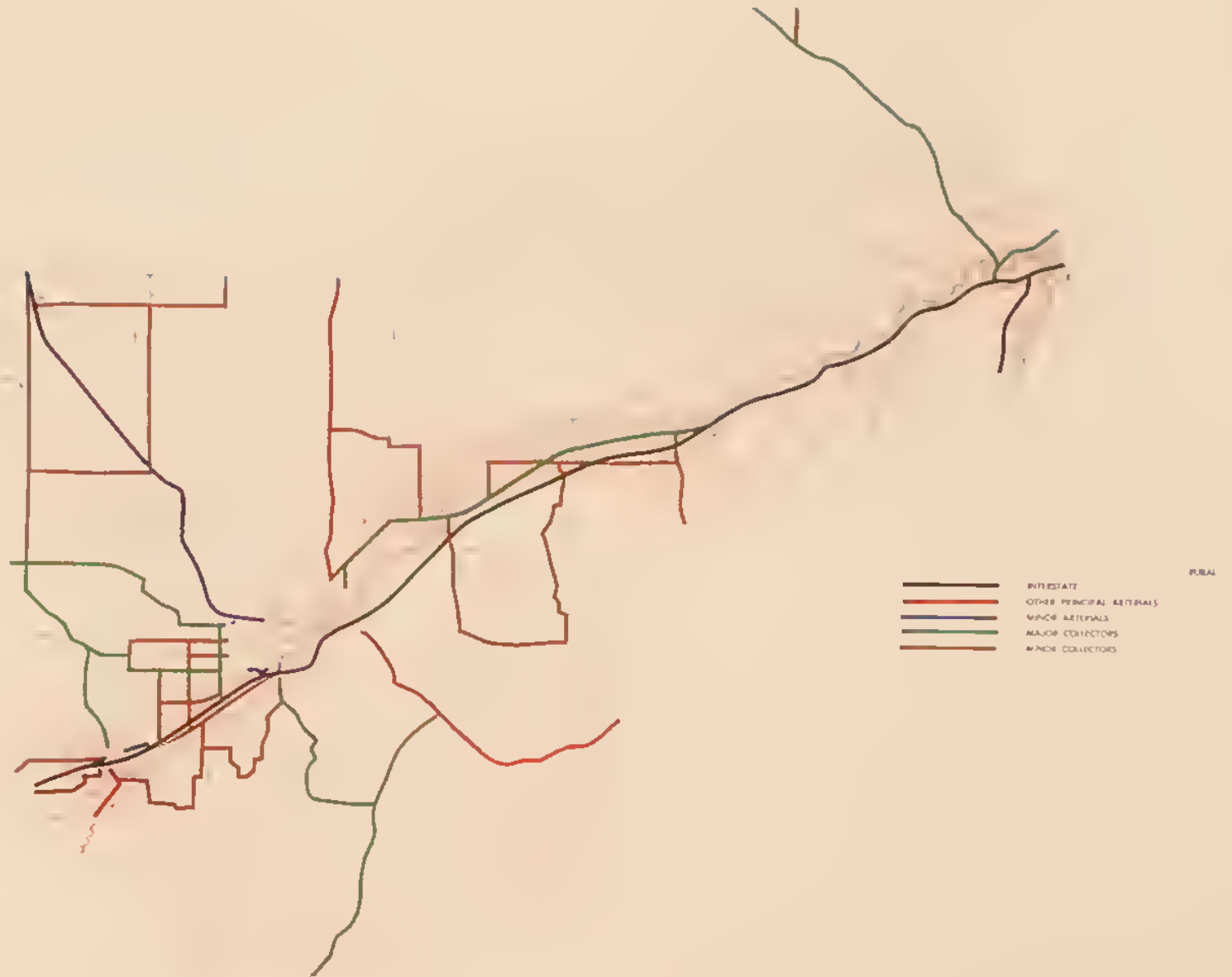
- INTERSTATE
- OTHER PRINCIPAL ARTERIALS
- MINOR ARTERIALS
- MAJOR COLLECTORS
- MINOR COLLECTORS



TETON COUNTY
1968 HIGHWAY FUNCTIONAL CLASSIFICATION
MONTANA HIGHWAY COMMISSION

MAP NO
10





YELLOWSTONE COUNTY
 1968 HIGHWAY FUNCTIONAL CLASSIFICATION
 MONTANA HIGHWAY COMMISSION

MAP NO.
 12

Appendix E — Liaison Reports

As required by the **1968 National Highway Functional Classification Study Manual**, the Planning Survey Section of the Montana Highway Commission corresponded throughout the progress of the study with the bordering states of Idaho, Wyoming, North Dakota, and South Dakota.

At the beginning of the study, preliminary classification maps were exchanged with each bordering state and tentative classifications of principal and minor arterials were agreed upon. After the rural systems were classified in accordance with the study manual, final classification maps were again exchanged with each of the bordering states and firm commitments made regarding the classification of all principal and minor arterials. Where logical, rural major and minor arterials were similarly classified across state boundaries.

Appendix F REFERENCES AND BIBLIOGRAPHY

References

1. U. S. Department of Commerce, Bureau of the Census, **Statistical Abstract of the United States, 1966**. P-4 U. S. Government Printing Office, 1967.
2. U. S. Department of Commerce, Bureau of the Census, **U. S. Census of Population, 1960 Number of Inhabitants, Montana** Final Report PC (1) 28-A. U. S. Government Printing Office, 1960.
3. *Op. cit.*, **Statistical Abstract of the United States, 1966**. P 4.
4. U. S. Department of the Interior, National Park Service, **1968 Travel Yellowstone National Park and 1968 Travel—Glacier National Park**, News Release letter, January 10, 1969.
5. U. S. Department of Transportation, Federal Highway Administration, Bureau of Public Roads, **Summary of Existing State and Local Roads and Streets, Form PR-528**, Montana, December 31, 1968.
6. Montana State Highway Commission, Planning Survey Section, 1968 Montana Federal-Aid Road Log, December 31, 1968, Table No. 9, P. 335.
7. Montana State Highway Commission, Maintenance Headquarters, **Code Type of Highways Maintained 1968-1969 All State**, Helena, Montana, February 7, 1969.
8. Montana State Highway Commission, Planning Survey Section, **Table TA-1-Statewide Mileage, Travel, and Fatal and Non-Fatal Injury Accidents for 1968**, Montana, April 8, 1969.
9. Montana Petroleum Association, **Montana Gasoline Gallonage Report December 1968**, P. O. Box 1398, 308 Petroleum Building, Billings, Montana.
10. *Op. cit.*, **Table TA-1-Statewide Mileage, Travel, and Fatal and Non-Fatal Injury Accidents for 1968**.

Bibliography

- Montana Department of Planning and Economic Development, **Montana Statistical Review**.
- Wilbur Smith and Associates, **Parking in the City Center**, May 1965.
- Wilbur Smith and Associates, **Transportation and Parking for Tomorrow's Cities**, 1966.
- U. S. Department of Commerce, Bureau of Public Roads, **Estimating Highway Needs in Urban Areas**, April 1965.
- Highway Research Board, National Academy of Sciences, **Shopping Centers and Parking**, 1966.



